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Columbia University Teachers College, 1987

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PARALANGUAGE IN ELECTRONIC MAIL:
A CASE STUDY

by

Janet F. Asteroff

Dissertation Committee:

Professor Louis Forsdale, Sponsor
Professor Robert P. Taylor

Approved by the Committee on the Degree of Doctor in Education

Date APR 27 1987

Submitted in partial fulfillment of the
requirements for the Degree of Doctor of Education in
Teachers College, Columbia University

1987

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ABSTRACT

PARALANGUAGE IN ELECTRONIC MAIL: A CASE STUDY

Janet F. Asteroff

This study explores the use of paralinguage in electronic mail communication. It examines the use of paralinguage according to the electronic mail and computing experience and technical expertise of 16 library science graduate students who fall into two groups by rank of experience, novice and advanced. These respondents used electronic mail in a non-elective and task-related situation to communicate with their instructor. This case study is based on a multi-level qualitative content analysis of the electronic mail exchanged between the respondents and the instructor, and the attitudes and experiences of the respondents about their use of electronic mail and computers. This research interprets the roles and functions of paralinguage in computer-mediated communication and explores the phenomenon as an indicator of certain kinds of expression.

Paralinguage is a component of spoken, written, and electronic communication. It gives to what is being communicated a character over and above that which is necessary to convey meaning in the linguistic or grammatical sense. Paralinguage in electronic mail is positioned between spoken and written paralinguage in its visual and interpretive structures. Electronic paralinguage, a term developed to describe paralinguage in computer-mediated communication, is defined as: features of written language which are used outside of formal grammar and syntax, and other

features related to but not part of written language, which through varieties of visual and interpretive contrast provide additional, enhanced, redundant or new meanings to the message.

Electronic paralanguage is revealed to be a component of communication which in some situations showed substantial differences by the rank of the respondent, as well as differences in individual behaviors. Novice respondents used more paralanguage in more types of messages than did advanced respondents. Electronic paralanguage also provides a robust picture of the character of communication. The use of exclamation points by novice respondents in task-related messages showed that electronic paralanguage can in certain cases be a general measure of stress and experience, and as well is a precise indicator of different kinds of positive and negative psychological stress.

Dedication

For

Richard B. Morris

Gouverneur Morris Professor of History Emeritus and
Editor, the Papers of John Jay
Columbia University

Teacher Historian Editor

Acknowledgments

My initial debt is to Professor Joan Parker, who for reasons of confidentiality cannot be identified here by her real name. She took time out of her own schedule to help launch this project, and without interfering in my own learning process listened to my ideas and offered guidance and suggestions at critical points. The students who participated in this study gave freely of their time and took an intellectual and personal interest in this work. There is no appropriate way to thank them for all of their efforts. Barbara Moo has for the last seven years been a valiant supporter and good friend. With Andy Koenig she developed QUERY, which allowed me to find the keys to unlock the mysteries of electronic mail communication. Their dedication to this project extended past writing program code and helped me to understand the nature of this research in too many ways to count. Mr. Henry Rowen, Rare Manuscript Archivist, Butler Library, Columbia University, shared with me on an ongoing basis his enormous knowledge of letters and letter writing and applied his analytical abilities whenever they were needed. His invaluable advice about how to write and survive a doctoral dissertation were hard to find elsewhere, and his sense of humor always was a safe port in the storm. Dr. Michael Lesk, Bell Communications Research, encouraged this project when it was only a vague idea, and saw it through to the end with personal, intellectual and professional support. Janet Skupien of the Department of Communication, Computing and Technology critically examined my work and helped me to understand several aspects which I might not have otherwise seen. Dr. Edward Roche and Hiroko Suzuki offered their personal and intellectual support at all times. Dr. Jessica Gordon listened to the many ideas and problems which surfaced over

the years. Professor Ronald Rice of the Annenberg School of Communications, University of Southern California, has for the last three years encouraged and guided my work in this field. Dr. John Carey fully supported this second approximation, and shared his work and experiences with me. His earlier commitment made this research possible, and I appreciate his staying healthy until the end of this project. Eileen McIlvaine, Louise Sherby and Anita Lowry of the Butler Library Reference Department have been a part of all of my research over the years, and their dedication to their work, good humor and personal interest made this undertaking much easier. Mr. Noshir Contractor of the Annenberg School of Communications at USC helped to facilitate this research in every way he could, even from another coast.

Many people have contributed to this research. I would like to thank Professor Rob Kling of the University of California at Irvine, Professor A. Michael Noll of USC Annenberg, and of Columbia University Professors Herbert Klein, Carol Garrity, and Roger Hilsman. Dorothy Marshall, Ray Aston, David Millman, Ruth Zerner, Shirley Willig, Dr. Howard Spivak and Rodney Hoffman offered help and support throughout the process. Dr. John Harper was a dynamic presence at the beginning and at end of my academic career, and helped to shape my ideas throughout the years. Special thanks to Jonathan for his technical assistance, and for doing everything I asked and quickly. This project would have been far more difficult without his help, and his interest in my work was always special. Ken Rossman provided critical computer support throughout with his usual good humor and precision. My family gave me the time and space I needed to complete my work, and their support was, above all others, the most important.

Of the Department of Communication, Computing and Technology in Education, Teachers College, I would like to thank Nancy Cunniff for letting me

share her office, play with the toys, and for listening to endless stories about counting exclamation points. Paula Schwartz has been a friend throughout the process, which was no easy task. Marie and Steve Taylor were always ready wits and concerned friends. Special thanks to Marco Mitrani and Karen Swan for letting me use their computer and smoke in their office, and to Anne Vollmer, Debbie Greh, Amy Heebner, Jeff Strange, Jean Follansbee, Jeanne Buckley, Sherman Alpert and Laurel Taylor for being delightful and valued friends. Mr. Chris Pino offered valuable advice on graphic representation as well as technical, personal, and intellectual support.

The members of my dissertation committee were all committed to this project and offered staunch personal support. Professor Carla Seal-Wanner contributed her interest in communication, good humor and sense of perspective. Professor Genevieve Cerf of the Department of Electrical Engineering offered her intellectual and personal support over the years. Professor Robert P. Taylor has made available to me many interesting and unique opportunities which have also provided income. His thoughtful interest in my work and career, sense of humor, and understanding of the human spirit has made me a better scholar.

Finally to my advisor, Professor Louis Forsdale, who suggested that I study electronic mail, seeing more clearly than I could at that time why I would find it of great interest. His guidance during the last five years has been invaluable, and his patience at my continued insistence that film is not mediated communication has been greatly appreciated. His work has served as a model for my own, and his dedication and commitment to learning allowed me to make my own mistakes and teach myself what I needed to know, for which I am eternally grateful.

J.F.A.

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Introduction

The study explores the use of paralanguage in electronic mail communication. Specifically, it examines the use of paralanguage according to the electronic mail and computing experience and technical expertise of the respondent. By interpreting the roles and functions of paralanguage, and analyzing the phenomenon as an indicator of certain kinds of expression, this research demonstrates how respondents with different levels of electronic mail and computing experience and expertise used paralanguage for a variety of purposes.

This is a qualitative case study which reveals both group behavior patterns and individual differences in the electronic mail of 16 library science graduate students who attended the Gotham University School of Library Science¹ in 1985. For these respondents, the use of electronic mail was non-elective and task-related. They were members of two classes required by their instructor to use electronic mail to communicate over the course of one semester. Electronic mail was a substitute for office hour meetings through which the instructor assisted the students with their written term paper assignment. This research is based on a multi-level qualitative content analysis of the electronic mail exchanged between the respondents and the instructor, and the attitudes and experiences of the respondents about their use of electronic mail and computers.

1. The names of the university and its library science division have been changed.

Paralanguage is one component of communication. It gives to what is being communicated a character over and above that which is necessary to convey meaning in the linguistic or grammatical sense. Paralanguage, then, presents meanings which are more expressive, emphatic and emotional than the literal meaning. In many instances, paralanguage also is a redundant property of language which prevents misinterpretation of the message. It provides additional text or signs through the same or a different channel to re-state meaning.

Paralanguage is a part of many different modes of communication, and its basic definition and function are common to all. In spoken paralanguage, the most frequently studied form, paralinguistic features such as stress, loudness, pitch and intonation are used to augment and enhance language. In written paralanguage, about which less is known than spoken paralanguage, features such as exclamation points, ellipses, uppercase letters, asterisks, graphic symbols, size, and color are used to convey meanings over and above that which is necessary to present the literal message of written language.

This study focuses on paralanguage in electronic mail and its use among 10 people who fall into two groups by rank of experience, novice and advanced. Electronic paralanguage,² or paralanguage in electronic mail and other computer-mediated communication systems, is the least studied among scholars. Unlike spoken and written communication, human communication via computer is not even two decades old. As a mode of communication then, much less is known about electronic mail and other systems than is known about speaking or writing. As a result, we know very little about the role of paralanguage in computer-mediated

2. The term electronic paralanguage has been developed from this research.

communication when compared to our knowledge of spoken and written paralanguage.

This study builds on the work of John Carey, who in 1980 was the first to systematically study paralanguage in computer-mediated communication.³ Carey showed that paralanguage relates directly to the idea of effectiveness in communication: "the presence of paralinguistic features . . . and the effort by users to communicate more information than can be carried by the words themselves, suggest that people feel it is important to be able to communicate tonal and expressive information" (1980, p. 69).

In order to understand the functions of paralanguage, Carey and other scholars have interpreted the phenomenon as it relates to the characteristics of the channel: computer-mediated systems are exclusively text-based forms of communication in which spoken and nonverbal cues, as well as many kinds of status cues, are completely absent. Paralanguage is viewed by many scholars as one means by which people compensate for the absence of these elements. Carey concluded that "it is not easy" to communicate information in computer-mediated communication systems, and that "users must work . . . to communicate information about their feelings and state of health which naturally accompany speech" (1980, p. 69). Paralanguage is one way in which computer users "work" to communicate more information than is available in written language.

Many scholars, including Hiltz and Turoff (1978), Carey (1980), and Kiesler et al., (1984), have examined how computers users at various levels of experience, frequency of participation, and at different levels of technical expertise use

3. John Carey, "Paralanguage in Computer Mediated Communication." *Proceedings of the Conference of the Association for Computational Linguistics*, 1980, pp. 67-69.

paralanguage to compensate for the lack of spoken and nonverbal cues. Hiltz and Turoff believed that more experienced computer users may have access to more types of paralanguage than do beginning or novice users. Carey concluded from his case study that "experienced and frequent participants employed more paralinguistic features" than new or infrequent participants (p. 69). Kiesler concluded that certain kinds of behavior and expression in computer-mediated communication can be applied to those at different levels of experience.

One way in which to interpret the various types of expression that may be shared because of experience and expertise is by identifying the existence of a code, or a "set of unambiguous rules, whereby messages are converted from one representation to another" (Cherry, 1982, p. 187). In 1980, Carey believed that a paralinguistic code may "be in the stage of development and learning" (p. 69), and in the last six years no scholar has identified a paralinguistic code for any type of computer user, novice or advanced.

From the perspective of examining the use of paralanguage according to the electronic mail and computing experience of the respondent, and taking into account situational factors such as the task-related nature of the communication and the communicants' relationship, the central questions addressed by this study are: What were the differences and similarities in the use of paralanguage by the rank of respondent? How should those who use electronic mail be classified? What did the use of certain kinds of paralinguistic features represent for the respondents individually and as two distinct groups? Can paralanguage be an indicator of the specific character of communication? How much was communication with the instructor a factor in the use of paralanguage? What was the impact of the non-elective and task-related nature of the communication? What roles did the cultural,

physical and technical settings of the University and the School of Library Science have in this communication? How can paralanguage be conceptualized and analyzed in computer-mediated communication systems? Can a paralinguistic code be identified among these respondents and other users of electronic mail?

Because of the small sample size, this research does not purport that its findings are applicable to the larger community of electronic mail users, or even to the same size group in different circumstances. Within this small universe however, it does reveal certain patterns of paralanguage usage according to the experience of the respondent.

Research Design

There are basically four sources of data for this study: 1) the electronic mail messages sent between the respondents and the instructor, 2) interviews conducted with the respondents and the instructor, 3) respondent questionnaires on electronic mail and general computer use, and 4) other general materials describing the computing environments of the University and the School of Library Science, the syllabus for both courses, technical computer documentation and computer system records.

Electronic Mail Messages. The primary evidence for this study was the electronic mail messages sent between the respondents and the instructor. These messages were collected from the instructor by the researcher during the course of the semester. Permission was granted by the respondents and by the instructor to collect and examine these messages. Between January 21st and May 15th, 1985, a total of 248 mail messages became available for this research, 128 written by the

respondents and 120 written by the instructor. These electronic mail messages were analyzed with QUERY, a qualitative content analysis program written expressly for this research by Barbara E. Moo and Andrew R. Koenig of the American Telephone and Telegraph Company. Messages were coded for paralinguistic features, the rank of respondent, the type of task, and the time they were sent.

Interviews. In order to accurately determine the experience of the respondents and their attitudes towards electronic mail and computing, in-person semi-structured interviews were conducted with the respondents during the course of the semester. An interview also was conducted with the instructor after the semester had ended. All interviews were tape recorded and transcribed. Respondent interviews include their comments on the form and content of the electronic mail messages, their use of computing facilities, and their attitudes about electronic mail and computing. The instructor interview concerned various aspects of the requirements and the instructor's opinions about the use of electronic mail and computing that semester.

Questionnaires. Two questionnaires were completed by the respondents. The Electronic Mail Use and Opinions questionnaire was designed to determine a variety of factors relating to their previous and current personal, occupational, and educational use of electronic mail, the role of electronic mail in office hour visits that semester and other kinds of instructor contact, and their use of specific electronic mail features. A copy of the Electronic Mail Use and Opinions questionnaire appears in Appendix B. The general Background questionnaire gathered personal information such as the respondent's age and class, length of time in the program and previous degrees, as well as information on previous and current occupational, educational and personal computer experience. This questionnaire also

collected information on traditional postal/paper mail correspondence and letter writing habits. A copy of the Background questionnaire appears in Appendix B.

Other Sources. Several other general sources were needed to describe the various environments which influenced the respondents. These included technical documentation on the computer system and the electronic mail application, as well as system logs of performance statistics. Literature on computing at the University, which described its facilities, costs for computing time, rules and procedures and other resources also was consulted. The Bulletin of the School of Library Science was used as background to describe that part of the environment, and the syllabus for each of the two courses was consulted.

Plan of Study

Chapter 1 introduces the reader to computer-mediated communication systems and their uses in various settings. It discusses the different styles of computer-mediated communication including electronic mail, bulletin boards, computer conferencing and interactive talk. It also discusses certain aspects of the computer culture and the types of people who are found in it. It then explores the idea of experience and technical expertise as determinants of paralanguage in computer-mediated communication systems. It explains how, within this research, these respondents were classified by rank and what their position may be within the larger community of electronic mail users.

Chapter 2 is the setting for this study. It presents the role of electronic mail and computing for these respondents including background on the two courses in which they were enrolled, the assignments, and the technical facilities. It

summarizes the experiences and attitudes held by novice and advanced respondents, noting both similarities and differences. It then presents an ethnographic description of the physical, cultural and technical computing environments which includes the School of Library Science, the University, the DECsystem-2060 mainframe computer, and MM,⁴ the electronic mail application. The impact of the technical environments on the use of paralanguage is analyzed. This chapter also presents the major situational communications context in which these events took place. The computerized complementary dyad is examined in-depth and its role in determining the use of paralanguage is explored.

Chapter 3 presents the methodology used for this research and explains all data collection methods. It presents a detailed account of electronic mail message collection, the organization of the mail messages, and the rationale for the content analysis categories. It further explains how message content was examined to determine the type of message by function and subject according to Bales' (1950) interpersonal communication categories. This chapter also presents the rationale by which paralinguistic features were identified and coded and the reason for the development of specific paralinguistic content analysis coding descriptions. This chapter explains the use of the QUERY program for data analysis. Examples of QUERY's data files are presented in Appendix B.

Chapter 4 is the review of the literature. This review analyzes the development of the literature about computer-mediated communication from 1974 to the present, and offers some predictions about the future trends of scholarship. It presents in-depth treatments of the scholarship on user behavior and expression in computer-mediated communication systems, the functions of paralanguage, and the role of

4. Mail Manager.

computing experience. It also explores the general literature on mediated communication and computing in education and in the university environment.

Chapter 5 explains the theoretical background for electronic, written and spoken paralinguage. It presents an analytical framework for the analysis of paralinguage in different kinds of media. John Carey's work on paralinguage in computer-mediated communication is presented and analyzed. Revisions of his work are explained and supported with new definitions, examples, and comprehensive categories. Three different areas of electronic paralinguage, alphabetic, symbolic, and spatial are described, and a formal definition for the new term "electronic paralinguage" is presented. Appendix C contains the ASCII character set and examples of spatial arrays.

Chapter 6 is the analysis of general electronic mail usage by these respondents including the number and types of messages sent. This analysis also makes clear when rank was and was not a factor in general messaging and explains the differences between individual and group behavior. Appendix D presents the General Message Distributions for messages with and without paralinguage by type and rank.

Chapter 7 is the analysis of paralinguage in electronic mail. Differences in rank, as well as in individual behavior, are noted in relation to the types of features which were used, the types of messages in which they appeared, and what their function was. Paralinguage as an indicator of certain types of communication is explored in-depth among novice respondents and for one advanced respondent. Appendix E is the Distribution of Paralinguage in Electronic Mail.

Chapter 8 presents the conclusions for this research.

Chapter I

Computer-Mediated Communication

Styles of Communication

The computer accommodates and promotes many different kinds of communication including machine-to-machine, machine-to-person, person-to-machine, and person-to-person. It is the last category, referred to as human communication via computer, or computer-mediated communication, that has experienced significant growth in business, research and academia since it first appeared in the late 1960's.

Computer-mediated communication systems are alternatives to traditional media for exchanging information and conducting business. Systems such as electronic mail, computer conferencing, bulletin boards and interactive talk permit written communication between two or more people at the same or remote sites via computer. The form of this communication is either delayed (asynchronous) or interactive (synchronous), and in both cases is electronically text-based (Asteroff, 1985a). Computer-mediated communication systems encourage many different styles of communication. Among the most popular are electronic mail, bulletin boards, computer conferencing, and interactive talk and messaging.

Electronic mail, the oldest and most widely used form of delayed communication on the computer, is widely used for exchanging information and opinion, transmitting documents, generating ideas, and staying in touch (Rice & Case, 1983). It is now established as a rapid and low-cost communications system

in the public and private sectors. The first major application of electronic mail was in the university scientific research community in the late 1960's. ARPANET, developed at academic research sites, is the oldest and most extensive computer network in the United States (Quarterman and Hoskins, 1986).

Electronic mail is delayed communication in the form of a message or file sent to one or more people who are located at the same or at a remote site. Messages are read by recipients after they sign on to their computer. The most common form of electronic mail is a private message exchanged between two people. Electronic mail is analogous to the traditional letter, since both are delayed, written communication between people (Asteroff, 1983, 1985a).

Bulletin boards, commonly referred to as "bboards," are also delayed communication. They are public or semi-restricted read-and-post facilities. Electronic and physical cork bulletin boards have the same purpose: they allow individuals to communicate with a large group of people whom the individuals usually do not know. The specific function of a bulletin board is different from that of electronic mail. A bulletin board is usually a public facility, designed for information sharing among a large group of people (Asteroff, 1983).

Computer conferencing systems are both delayed and interactive. They include electronic mail and bulletin boards as well as many features not found in either of those two forms. A computer conferencing system makes possible a structured or semi-structured online conference about specific subjects for a small or large group of people. It supports several levels of public and private delayed and interactive messaging between users, as well as interrelated subconferences, text editing, file transfer, and in some cases questionnaire capabilities, polling, voting, and anonymity. A computer conference often has a moderator (Asteroff, 1983).

Interactive talk is the linking together of one user's terminal output with that of either one or several other terminals at the same or remote sites. Each user's typing appears on the other terminal(s). This facility often is used for interactive "conversations." Some interactive talk facilities, by dividing the screen into several areas, allow a small group of users to participate in an interactive "conference." Interactive messaging, which is similar to interactive talk, is a short or one-line message to another user's terminal sent in the middle of a computer session (Asteroff, 1983).

The User Community

In the last decade, as private and commercial computer-mediated communication systems have gained popularity, the types of people who use electronic mail and other systems has become extremely varied. Where once the users and uses of electronic mail could be described as technically expert computer scientists communicating about research, this no longer is accurate.

The availability of low-cost microcomputers, networks and timesharing systems, as well as easy-to-use applications, has played an important role in the widespread use of computer-mediated communication systems, particularly electronic mail. In business, electronic mail systems are used by secretaries, mid-level managers, and chief executive officers. In academia, those in the hard sciences have been joined by students and faculty in the humanities and social sciences, and by administrative staff members of all ranks. Hobbyists, or those unaffiliated with institutions per se, also comprise an important part of this user community. They are drawn from all parts of society, and use computer-mediated communication for many different reasons.

The growth of computer-mediated communication does make it difficult to categorize as a "community" so many different types of users, with various purposes and levels of technical expertise. "Hackers," the technically expert computerists who many believe occupy the highest position in the computer culture, do not always use electronic mail in the same ways as do mid-level managers, and neither use it in the same ways as beginning students or technical support personnel. For some it is an essential communications system, for others an occasional hobby, and for still others a required task. Some enjoy using computer-mediated communication systems, others do not, and still others do not care at all. There are many differences among these groups, and as would be expected in this text-based media, the use of language and other components of communication, especially paralanguage, are often the most prominent.

One of the most important changes that has come from this growth is the degree of technical expertise which is needed to use these systems. Many electronic mail systems are now easier to use than in previous years. This permits communication without a great deal of knowledge of the computer system itself or some of the more advanced features of a specific application. And for some commercial electronic mail services, the actual type of computer is completely unknown and irrelevant to the person who uses it.

As technical expertise becomes somewhat neutralized by the growth of electronic mail and its ease of use, experience takes on additional importance. Experience allows all types of users to not only send a great deal of electronic mail, but to read much more electronic mail and bulletin board postings from others who are both less and more advanced. This kind of exposure would make those who frequently use electronic mail more comfortable with it as a mode of communication

than those just beginning to use the medium, and this experience may account for the adoption by these types of users of certain styles of language, paralanguage, and other conventions.

Yet while we know there are differences in how people make use of computer-mediated communication systems, we know far less about what these specifically are than we know about the differences in general computer use. At least at present, then, there is no typology of characteristics of computer-mediated communication users. But these differences should not obscure the overall similarity: all share the reality of communicating through this medium.

In order to accurately evaluate the respondents in this study and provide a structure for this specific user community, it was necessary to isolate certain criteria which related directly to computer-mediated communication. Two criteria examined herein are technical expertise and electronic mail experience. In this research, all respondents were categorized in relation to one another rather than to the larger user community. Within this universe of 16 respondents then, all were classified as either novice or advanced according to their technical expertise in text editing and their previous electronic mail experience.

The ability to edit or revise a mail message with a text editor before it was sent offered maximum control over its final form and content. Those who could edit a message had complete technical control over the use of paralanguage. They could also easily change the content of their messages before they were sent. Those who could not edit their messages could not technically control the appearance of paralanguage, nor could they change the content of their messages before they were sent, at least not to a reasonable extent. Those without any electronic mail text editing ability were ranked as novices, while those who could edit their mail

messages or create them independently of the mail application itself were ranked as advanced. The 16 respondents were divided into two categories: 10 novices and 6 advanced. None of the respondents were classified as intermediate since editing a message was the most important technical aspect in their use of paralanguage, and therefore presented an either-or break between the two groups.

Editing ability was determined at the outset of the data analysis from both the questionnaire and interview data which specifically addressed the use the text editor and other electronic mail features, as well as personal habits in this area. Since none of those who could not initially edit a message learned to do so during the semester (although some did learn the text editor for other tasks), it was a consistent measure of rank. Some novice respondents did use the backspace key to change their messages, usually for correcting spelling and typing mistakes. Some would backspace, or completely erase, two or three lines in order to correct an earlier error, while occasionally some others would delete as many as ten lines to get to the error. Those who used this method considered this a grossly inefficient and haphazard means of changing their text. And, at those times when the backspace or erase feature did not work properly, which was very often, even this form of minor editing was impossible. All of the novices strongly resented the fact that editing a mail message was very difficult for them, and believed that the ability to change their text easily should have been a part of the electronic mail system.⁵

Once rank was assigned it was verified by the content of the actual respondent messages, but only when that content related directly to the use of electronic mail and the completion of technical tasks. In some cases the completion of the

5. See below p. 32 for a technical explanation of the use of the backspace. See also the comment on p. 44 for a characteristic opinion on the inability to edit messages.

computer assignments was used as an additional verification of rank. The final result was that all ranks except two were confirmed as originally determined from the questionnaire and interview data. One respondent had her rank changed from advanced to novice based on the types of text editing questions she asked in her mail messages. Another had her rank changed from advanced to novice because of serious problems with one of the computer assignments which also involved text editing. The content of the mail messages from these two respondents clearly indicated that they simply could not have had the text editing expertise they reported during their interviews and indicated on their questionnaires.

Respondents who lacked editing abilities and who were classified as novices also did not make use of many other features of the mail system and had difficulty completing other computer assignments. This was particularly true for those tasks which required text editing. Although some attempted to learn the text editor as the semester progressed, none learned it well enough to edit a mail message. Respondents who could edit text and also understood system commands, classified as advanced, took advantage of many features of the mail application and used other system programs.

Computing backgrounds and experiences with electronic mail cited in questionnaire and interview data were also used as criteria for rank. Two respondents who had extensive computer, electronic mail and text editing experience at Gotham and elsewhere, but who did not edit their mail messages, were classified as advanced. These two respondents reported that they did not think it important enough to learn (or to bother with) the text editor, since they were saying in their messages what they wanted to say or, they were unconcerned about what they did say. These two respondents felt comfortable with electronic mail and the computer

and clearly were not new to the forms; therefore, they could not be considered along with those who had little or no experience. Their lack of editing was expressed during interviews solely as a lack of initiative and not a lack of ability, since they both knew how to use other text editors. Their overall technical abilities also differentiated them from the novices, and further justified their advanced ranking.

Who were these respondents in relation to the larger user community? To offer a wider perspective about the use of electronic mail, it is important to understand where they are located in the general population of electronic mail users.

Yet it is difficult to precisely position these respondents within this large and diverse group, particularly since categories such as novice, intermediate and advanced have no clear criteria and are rather rigid. All of these novice respondents would remain such in a more broadly based analysis, although none could be considered the same as complete novices who had never before used a computer or electronic mail.

Some of the advanced respondents, approximately three, would most probably be classified as intermediate users. Those with text editing ability but with little experience would be different from other beginning or novice users who would not possess the former, yet these respondents' brief exposure to the medium and lack of higher technical skills would place them well below advanced users. When compared to those who use electronic mail every day and/or for several years, these respondents' six or twelve months of experience simply was not the same.

The remaining three advanced respondents had enough electronic mail and computer experience to clearly stand apart from the others in their group. Within the larger community of electronic mail users they would fall somewhere between intermediate and advanced, or perhaps remain as advanced. More precise positionings await the formulation of a typology of electronic mail users.

Chapter II

Setting For This Study

The School of Library Science at Gotham University is a small, prestigious graduate school which attracts students from around the world. Those who participated in this study reflect the heterogeneous population of the University as a whole. Most of these students were enrolled in the M.S. program, while others were pursuing a Doctorate in Library Science. Most had undergraduate degrees in the humanities and social sciences, and many had second M.A. degrees in fields such as English and History. Almost all students planned to become librarians, while a few planned to teach library science. Participants were both part--time and full--time students.

Library Science 105 and 106, offered in the Spring, 1985, were advanced courses open to degree candidates who had completed certain core requirements. The instructor had taught these two courses at Gotham and elsewhere prior to this time. Only one course contained significant subject matter about the role and use of computers in library applications, such as acquisitions and circulation, but was not concerned with the more typical applications of computers, i.e., programming, statistical analysis or text processing. Since the course content was not related to the functions of the DECsystem-2060, the computer system on which the respondents had to send electronic mail, it had no influence on their ability to send electronic mail or perform related tasks. The content of the other course did not pertain directly to computer applications but to problems and trends in technical services.

The Role of Electronic Mail and Computing

The instructor used electronic mail as an elective communications system during the previous semester, but most respondents did not use the facility to communicate with her or with one another. During this semester electronic mail was required, and listed in the syllabus along with other computer assignments as part of the course work. The computing requirement was considered as one component of the final grade. Not all respondents took this requirement seriously however, and this was reflected in their final grades.

An account on the University DEC-20 system was mandatory, but the amount of time each respondent spent online was an individual decision. Sending mail was the first requirement, and this then included learning MM, the electronic mail facility on the DEC-20. Finger-plans, or text files attached to a person's computer ID for public viewing, created with the popular full-screen text editor EMACS, which also had to be learned, and login command files, created with the semi-automatic make-login command, were required as well. Bulletin board usage was optional but recommended.

The instructor spent several class hours reviewing the use of MM and EMACS as well as other features of the computer system, including file protection codes so that the finger-plan.txt could be visible to others. An informal and unofficial thirty-page manual from the Department of Computer Science was also made available to the respondents. A general introduction to the DEC-20, this manual briefly explained certain system commands, MM, system-wide bulletin board facilities, and EMACS. Official university computer center documentation for this system and its applications was also available to the respondents, although the

novice respondents who needed it the most seemed to know of it the least, and were wary of consulting reference cards and longer manuals. For some of these respondents, direct help was later given by the instructor through electronic mail and in a few private sessions at the terminal. The online help files were not only completely useless for many of the respondents, but apparently confused them even more.

Electronic mail was the most important component of the computing requirement. It had to be learned as one of the computer's applications, but it was also the means by which the respondents communicated about their written term papers. The electronic mail application, MM, is a public domain program used on many academic and commercial DEC-20 systems. It prompts for recipient, carbon copy and subject, but only a recipient need be specified in order to send a message. Editing a message within MM before it is sent is possible, and requires an advanced knowledge of EMACS buffers. Users may circumvent almost all of MM's text entry and editing procedures by creating a message separately, with EMACS or with any other editor, and inserting it into MM for delivery. Some advanced respondents were able to do this and therefore had considerable control over the text of their messages. Other features such as multiple recipients and mail text file management also were available and were used by some of the advanced respondents and to a lesser extent by the novices.

Once the user enters the message field in which the text of the message is typed, MM provides various instructions on how to exit the message field and send the message, edit a message, redisplay the message, or abort the message. These instructions were of great help to many respondents, except for redisplaying a message, which did not work properly with the terminals in the Library Science lab,

as explained on p. 29. Reading a message is done in a separate read mode, as MM moves sequentially through each new message, pausing to allow the reader to reply to the sender. Since MM does not make the reply-to-sender option readily apparent at that point many respondents, particularly the novices, were unaware of this convenient feature and started new messages each time by typing in the instructor's full ID name and subject header text. A variety of options exist to merge all of these communications tasks, but are extremely advanced and were not used by any of the respondents.

All of the respondents, regardless of rank, believed that MM was an easy application to use at its most basic level, that is, sending and receiving messages. However, many found it very difficult to move past this level to gain more control over what was sent (editing or correcting text) and received (reading earlier messages and replying automatically). MM is one of those applications, of which there are too many, that is easy to explain in person but difficult to explain in writing (Asteroff, 1985b). This is true in part because it is not designed to follow the logical sequence of communication. Written guides and other forms of printed and online documentation usually do not help the user. MM itself offers too many options at each point, which often is confusing. The problems many of the novices encountered were related to the DEC-20 system and not to MM. To use MM effectively, one had to have certain knowledge of the DEC-20 system, specifically, how to use the Escape and Question Mark options to get context-sensitive help and complete commands, how to monitor and compensate for limited disk space, and how to define editors.

Of the major computer assignments, learning and using MM was the easiest for all respondents. For those who had not used full-screen editors prior to this

time, learning EMACS was for all novices extremely difficult, and for some, impossible. Those few who did struggle to learn EMACS successfully created a finger-plan.txt and other text files for their own use.

Class bulletin board usage, which should have been a very easy task, both for sending and reading, was extremely difficult because of the application's structure and interface. This was a new interface, developed by the computer center staff, and which they did not adequately support. The class bulletin board attracted less than half a dozen messages, although it may have been read more often by respondents who did not post messages.

The Computing Environments

The ability to learn MM, EMACS and the DEC-20 was directly related to how well the respondents negotiated the various computing environments of the University. In this research, those with previous knowledge of these applications and facilities were few, and perhaps reflected the general population of electronic mail users at the school. In the following analyses, the impact of these environments on the use of paralanguage as one component of communication is explored.

The use of electronic mail by the respondents in this study was in part determined by the physical, cultural, and technical computing environments of the University and the Library School. For all respondents, the physical and technical environments determined work locations, access to the facilities, the kinds of systems they used, and what they could accomplish. Some could and did occasionally circumvent the physical environment by working from home, but these few were exceptions.

The cultural environments at the University and the Library School were shaped in part by the physical and technical realities. In the University as a whole, including its library science division, the widespread neglect of humanities and social science computing impacted significantly--and in many cases unfavorably--on the respondents' abilities to get their work done. For many this had a negative influence on their attitudes about the electronic mail requirement for this course.

The School of Library Science

Gotham University's reputation for academic excellence does not extend to computer technology and applications, at least not outside of the hard sciences and computer science. Its central computing administration, characterized by a hard science infrastructure, was ill-suited to support those in the humanities and social sciences with little or no computing experience or technical background. Gotham was not a computer-intensive school either on the undergraduate or graduate levels, but it would not necessarily have to be in order to support those from many different disciplines.

Not surprisingly, then, the School of Library Science was not a school of information science, a metamorphosis that has taken place--spurred by developments in computing--for many other library science schools. Except for bibliographic and similar database services there was no particular emphasis or official support for computing. Only one introductory course in information science, and one Basic programming course, were offered as electives. As a result there was little exposure to information science areas such as human-computer interaction, computer-mediated communication systems or storage technologies. Only one other faculty member regularly used electronic mail to communicate with students.

Therefore most respondents in these two classes had little or no experience with the University's computer facilities, its mainframe computer system or the electronic mail application before this time, although a few had experience with other university and commercial mainframe and electronic mail systems. For almost all, this was their first extensive practical and intellectual introduction to computing outside of bibliographic searching.

Technical Environment

The DECsystem-20 Computer

Gotham University provided several DEC-20 computers for instructional use. Networked locally though Decnet, sending mail and transferring files between machines was well supported by various utilities, documentation, and consulting. It should be noted that during this semester, the DEC-20s and their networks had a greater than 97% uptime rate. System downtime or unavailability then, was not a factor for these respondents.

Student computer accounts were available for \$35.00 for 40 disk pages.⁶ All student accounts were limited initially to six hours per week of "prime time" connect time/access to the computer between 10:00 A.M. and 10:00 P.M., Monday through Thursday and 10:00 A.M. to 7:00 P.M. on Friday. Computer access outside of prime time, including weekends and holidays, was unlimited. Many students at the University, including several respondents in this research, found these time and disk space limits unreasonable and difficult to work with. Some respondents met their time limits before the week was out; this forced them to work either very early

6. Approximately 100,000 characters.

in the morning, later at night, or on the weekends, which the commuters found annoying if not impossible. Still others deliberately limited their time on the system to stay within the prime time hours.⁷ Additional disk space and prime time could be purchased in graduated increments to increase each of these quotas substantially. Although no respondent in this research did so, since many believed the \$35.00 investment for the course was enough, it was unclear if they were aware of the opportunity.

Exceeding disk space quotas did force the termination of some mail messages the respondents were in the process of sending to the instructor. This was more a problem for novices than advanced respondents. The message would be completely typed in, but the command to send the mail would return the error message "quota exceeded" and then force the user completely out of the mail facility, back to the main level of the DEC-20. Since the mail application made a temporary copy of all outgoing messages which was not deleted until the respondent logged off the system, disk space allocations could easily be met in one session when several mail messages or a long message was composed and sent. While some respondents knew how to monitor their disk space, and to avoid or subsequently recover from this problem, most did not. In these cases the messages which were aborted during that session either were never sent, or were re-keyed from memory at a later time when the respondent was again able to access the mail facility.

7. For the impact of these limitations on the number and types of messages sent, see below p. 145.

Physical Environment

Several campus locations provided a variety of computing facilities and access to approximately 200 public CRT terminals connected to University mainframe systems. Ten computer center CRTs and one hardcopy terminal were located within the library itself, the same building which housed the School of Library Science. Although a few user areas were open twenty-four hours a day, most were not, particularly those located in public buildings with standard hours, such as the library. Public user areas were for the most part poorly lit, cramped, and not very well ventilated, a situation which reflected the acute space problem of the University as a whole. Problems with user areas, however, were and are not peculiar to Gotham, and are more the rule than the exception at most schools (Sproull, Kiesler & Zubrow, 1984). Several public user areas had complete facilities and consultants, however, and some novice and advanced respondents did take advantage of these University resources. But many, particularly the novices, did not, or stuck closely to the more limited public user area within the library which was better lit, somewhat less crowded, and perhaps more civilized than the others. Toward the end of each semester, however, all of the public facilities were crowded, with long waiting lines for terminals.

The Library Science Computer Lab

The School of Library Science had its own computer lab exclusively for its students. Well lit, spacious, and airy, although not properly designed for these technical activities, this computer lab provided an on-site consultant for bibliographic related activities, 300 baud dial-up access to University mainframes,

and 1200 baud access to external bibliographic services such as OCLC and RLIN. Microcomputers and printers also were available.

The Library Science computer lab was largely inadequate for campus mainframe applications and those who used it for electronic mail were at a distinct disadvantage in all areas. Those respondents who could avoid the lab did so, but many of the less experienced were afraid to venture out onto campus, or even to another part of the library, to use the more appropriate facilities provided by the University computer center: these respondents lacked both the information and confidence they needed to use the computer center terminals and high-speed campus-wide network. For some, the availability of printers connected directly to the terminals (a feature not publicly available elsewhere on campus) was an added enticement to work in the library computer lab. The security of a printed copy often meant that they did not have to learn the mail facility to the point of retrieving previous messages or saving online copies of their own. Ultimately, those respondents who continued to use the library computer lab for mainframe access encountered more problems in sending electronic mail than those who did not.⁸

Among the drawbacks of the Library Science computer lab was that the on-site consultant did not provide help with the University's mainframe applications. Telephone calls to the computer center's consultants were given second priority over those who visited the consultant's office in person.⁹ In addition, access to the

8. See the messages beginning on p. 30 for evidence of some of these problems.

9. It was the policy of the user services group to put all callers on hold until those who were actually present in the consultant's office were helped. The wait time for callers could be as long as 30 minutes. The consultants did not feel compelled to help those who did not appear in person, and the respondents reported that often their attitude towards callers was neglectful or abusive. See the message of 13 February, p. 31.

mainframe was only available at 300 baud, an extremely slow speed which made any work that much longer to complete.¹⁰

Terminals and Text Entry. The most serious problem with the Library Science computer lab was the type of mainframe computer terminals, since for these respondents it impacted directly on text entry for electronic mail, system commands, and all EMACS editing tasks. The Hazeltine Esprit terminals used in the computer lab to access the DEC-20 were not technically supported by that system or by the computer center staff. While it was easy enough to simply delete a character or word from the command line or mail message, the result of this action was extremely difficult to work with. Characters input in lower case would automatically be translated into uppercase for no apparent reason and with no ready solution. Finally, the advanced respondents who knew how to edit messages could not do so on these terminals, and those novices who wanted to learn how to edit messages also could not do so. Thus the incompatibility between the Library School's computer lab terminals and the DEC-20 had disastrous consequences for any kind of text entry, as shown in varying degrees by the form and content of the three messages below.

The first two messages are from novice respondents simply trying to get the message typed in and sent. The third is from an advanced respondent¹¹ who was much more in control of the facilities and therefore had the luxury of being humorously annoyed by their shortcomings.¹² The subject of the second message

10. Computer center terminals supported direct 4800 or 9600 baud lines, minimally more than ten times faster than the dial-up lines at the library school's computer lab.

11. For a profile of this respondent, see below p. 178.

12. The researcher's editing is indicated as [. . .] and means the entire communication is not reprinted here to conserve space.

was exclusively problems with electronic mail. Poor typing and therefore bad spelling is evident only in the first message but not in the other two, and was most likely a direct result of the facilities. The reference in the third message to problems with line endings, or text that wraps around the end of the screen with no carriage returns, is only slightly in evidence in the original copy of the message, but could not be represented in print as such even if it existed clearly and overwhelmingly.¹³

Date: Sat 9 Feb 85 12:21:21-EST
 From: jill f gavin <LS4.JF-GAVIN@GU20D>
 Subject: Class project (106)
 To: ls5.j-parker@GU20A

dear prof. parker,

I guess you didn't see my lastmessage about the outline. I'm having a hard time deciding where to begin. Also, another women in the class, margaret ssuzki, is thinking of working on the manual with me. Up until the ge beginning of this semester, Margaret was doing the same job in preservations as I am now and was invo;lved with RLIN in the same wayy I now am....(just an aside, I hate the fact that I an can't correct or edit what I type in this machine...it makes me feel like a co moron!! Please excuse....) etc. etc. Any way, Margaret had the same problem I'm haveing , getting to know and understand the RLIN commands and what the different screens were, etc., etcc. and she agreews that a manula manual would beveryy useful fort for the department itself. (Can you read this mess?) What do you think [. . .]

j.gavin

13. See the Technical Note, Appendix A, p. 202 on representing electronic mail text in print.

Date: Wed 13 Feb 85 20:54:02-EST
 From: robin m butler <LS4.RM-BUTLER@GU20D>
 Subject: problems with electronic mail on 2/13/85
 To: ls5.j-parker@GU20A

I just ran a message to you. When I tried to control l to clear the screen and redisplay the message, it ran many times. I could stop it with control s, but as soon as I started the screen (with control q) it ran again and again and again. The computer center told me to call back in five minutes, and when I did noone answered. So I will put my first message in you mailbox right now so that you can answer it when you get it. This is the second time that this has happenend to me on this system. On monday it happened when I was writing to Professor GARRITY, AND when I finally got it to stop it never sent the message--I had to leave it in her box also. I will take a chance and try to clear the screen befor e I send this to you.

Date: Tue 5 Feb 85 13:41:08-EST
 From: Kate R Lindsey <LS4.KR-LINDSEY@GU20C>
 Subject: continuing on about my paper...
 To: ls5.j-parker@GU20A
 CC: ls4.kr-lindsey@GU20C

Hello again!

I think there is some question about my topic. I don't think I was very clear about it. I KNOW I was not very clear.

Anyhow, I m afraid that I cannot make a manual for the museum online system, as they do not know when any function other than the catalog will be available at the the museum.

(if there is an incredible problem with line endings here, it would be because I am attempting to work today from the LS comp.lab.'s hazeltines rather than from a normal (if one could use the term in this context) terminal; not that I missed your message [. . .]

---Kate

Typically, a user gives a command to define a terminal by its specific name from a list of supported terminals resident on the system. There were over two dozen terminal types from which to choose. Very often however, the DEC-20

automatically recognized the correct terminal type when a connection was made, so the user need do nothing to enable terminal paging, backspacing, and the proper use of EMACS and other programs. Since the Hazeltine terminals were not supported by the DEC-20, the computer system's automatic choice was invariably incorrect.

Working with the library lab's CRT, the respondents would have had to supply two incorrect terminal types to reasonably accomplish two completely different types of text entry tasks, i.e., electronic mail text entry and EMACS text entry. That is, in order to make the terminal respond properly for text entry for these two different applications, the respondent would have had to switch back and forth at the command line between two different terminal types, neither one of which was Hazeltine. No respondent had success in deciphering the dual terminal types, although some did manage to define it correctly for electronic mail but not for EMACS. With one definition, the backspace or rubout key did not work properly, but EMACS could be accessed. With the other definition, EMACS could be accessed but input was only in uppercase. Finally, in neither case could EMACS, the text editor within the electronic mail facility, be used to revise or correct a mail message before it was sent.

Therefore the situation which existed for many of these respondents, both in the mail application and at the command line, was that the backspace key failed to rub out or completely erase the character. Instead, it inserted a backslash to show the character had been effectively deleted, even though it still appeared on the screen, e.g., `dirr\r`.¹⁴ This final result was not apparent to the respondents, who did not know if the character had actually been deleted. In any case the text display

14. This is a common occurrence when terminals are not properly defined for a system and therefore should not be considered unique to this experience.

eventually became of a long string of duplicate characters and backslashes which made it extremely difficult to read and impossible to know where the line ended and a carriage return was needed. In the first message on p. 30 the respondent did not even attempt to use the delete or rubout key, aware that it would bring these unwanted results. In the third message, the respondent was aware of the problems with the line endings and tried to compensate for them by informing the instructor of the dilemma.

This situation also existed within EMACS, the standard editor and the only practical editor available in the mail facility, which then could not be used without a great deal of difficulty and discouraged novice respondents from learning the application. In addition, within the mail facility, the lack of terminal type recognition prevented effective screen clears (with a Control-L) for those who attempted to refresh their text, as demonstrated in the second message. A screen clear created a runaway and unstoppable display remedied only by dropping the telephone line and logging back on to the computer with a new job.

The Communications Context

The Computerized Complementary Dyad

The major situational communications context in which all of these events took place was the secondary complementary dyad: two people of unequal status communicating through the computer. There were 16 separate dyads, since each respondent entered into an individual electronic mail relationship with the instructor. The idea of an electronic dyad created through the computer is a relatively new communications situation about which little is known. Of the several types of

dyadic situations determined by technology, including the telephone, the computerized dyad most closely approximates letter writing, since both are secondary and written. Yet while its paper-bound predecessor offers some insights, it is perhaps too different to invite a comprehensive comparison. The type of language and paralanguage used by these respondents was strongly influenced by many aspects of the complementary computerized dyad, and is explored below.

The complementary nature of the relationship between the respondents and the instructor is one part of the relational communication aspect of this situation. A complementary relationship is based on differences or inequality; it is characterized by one or more members of the relationship occupying a superior or primary position, also referred to as the one-up position, and one or more members occupying an inferior or secondary position, also referred to as the one-down position. In this situation the complementary relationship was strongly reinforced by the non-elective, task-related subcontext of the communication: the stated purpose of the communication was first, to communicate about the assigned term paper and second, to complete and communicate about the assigned computer tasks. The complementary relationship is the exact opposite of the symmetrical relationship, which is based on equality, or where both parties occupy the same position, as in a peer group.

For all the respondents, regardless of rank, the complementary aspect of the relationship transferred, albeit with modifications, from the traditional in-person office hour meetings to electronic mail. Interview data reveals that all respondents were aware that their instructor was the recipient of their mail. Although no respondent believed that they said anything in their messages which they regretted and would have liked to take back, or which was impolite or disrespectful, many did

notice some interesting changes in their communication in regard to the complementary nature of the relationship.

That the respondents did not regret or wish to retract any of their messages supports the idea that audience awareness was extremely high. That they were aware of who would be reading their mail was undoubtedly due to the complementary, task-related and non-elective character of the communication. And not only was audience awareness high, it very often was situationally precise. The instructor informed the respondents that she would read their mail every evening from home and reply at that time,¹⁵ and interview data supports the fact that the respondents were very aware of this specific fact when scheduling messages or actually sending messages, as demonstrated in the extreme by this one advanced respondent's amusing scenario:

I tend to view Professor Parker as logging on . . . she told us she tries to log in everyday just before she goes to sleep . . . so you have this vision of Professor Parker . . . sort of groggy with a cup of cocoa . . . sitting down . . . in a houserobe . . . and sort of sitting at the terminal just checking in

Some respondents believed that their electronic communication was at times more informal and open or more personal than would have been true in face-to-face office hour meetings. They essentially felt that this was a good experience, although it did make some of them uncomfortable if they perceived it as slightly outside the boundaries of the traditional complementary relationship.

Other respondents noted in a few cases their electronic communication was more negatively expressive and excited than would have been in the case in face-to-face meetings, as evidenced in the novice electronic mail message below. This

15. The instructor also often read her mail during the day.

type of negative or uninhibited expression also is common to letter writing, another mediated and delayed situation.

I had three hours of study time after my class tonight--time I dearly needed to keep up with my five course load. I came into the computer room to send Professor Garrity a letter on my reading for 110, and to do my finger plan for 105. It is now two and one half hours later. One mm scrolled. After I aborted it and put the hard copy in Professor Garrity's mailbox I attempted to write and tell her it was there. In the middle of that communication someone named LS4.j--webster cut in on my program and it took the computer people one half hour on the phone to get me back to mm.

Then I innocently tried to read my bboards. Lee and I could not get the system to read the boards for us, and when we typed HELP BBOARD it took the system twenty minutes to print the information. it just stopped dead, and you couldn't get out, and just had to sit there and wait.

Forget starting the finger plan due in class (105) tomorrow night!!!

I am exhausted, and frustrated at this invasion into my precious time for study. And I give up on it for a few days. Enough is enough.

In her interview, this respondent reported that she "wouldn't have yelled at" the instructor in person, but because she "didn't have to watch" the instructor "it was less direct" and therefore permissible to be deliberately and directly angry. This respondent felt that in person she would have instead told the instructor that she "resented the use of my study time" on these computer tasks "which had *nothing* to do with the subject of the course." Still, the respondent did not believe that this negative expression was inappropriate in electronic mail. Conversely, some respondents who sent messages with negative excitement, such as the message 5.d on p. 174, felt that electronic mail did not allow her to express *enough* anger or frustration, and that these kinds of negative messages were just another form of acceptable communication.

Regardless of whether mail was highly positive, strongly negative, or neutral, several novice and advanced respondents who used electronic mail with others in the class or with friends on the system commented during their interviews that peer communication was very different from this complementary communication. Peer communication was much more relaxed, included both dirty and clean jokes, "whimsical" mail, highly personal and intimate information, gossip, and at least for one advanced respondent, graphics of beer mugs. This advanced respondent, who sent only 3 paralinguistic features in the same number of messages, remarked that he often sent elaborate graphics to his friends, but would not send these types of graphics to his instructor. In noting the differences between these two types of communication, many respondents opined that their writing was more formal because the message was going to a professor.

What is interesting about the expressive communication in these instances is that it supports divergent theories about certain kinds of behavior in computer-mediated communication. Hiltz (1978) found "tendencies toward overt sociability and a 'letting down' of a public image." Kiesler et al. (1985) found a greater tendency toward negative uninhibited behavior, specifically impolite remarks and swearing.¹⁶ Some of the communication of these respondents, as described above, falls into both of these categories. Yet particularly in the case of the negative excitement, it stayed within the boundaries of the complementary relationship which existed on electronic mail, although the boundaries may have been drawn somewhat more liberally than in face-to-face relationships precisely because the communicants could not see one another. Perhaps the pivotal judgment for these respondents was that they did not believe any of their communication to be disrespectful to the

16. See pps. 79 and 96 for a complete review of this literature.

instructor or otherwise outside of the rules of the relationship. Nor for that matter did the instructor believe that any of the mail sent to her was rude, disrespectful, or otherwise objectionable. All communication then, fit fairly comfortably within the somewhat extended limits of this particular complementary relationship, since all traditional status rules remained in-tact.

The dyadic relationship formed between each student and the instructor through electronic mail is another part of the relational communication aspect of the situation. The dyad describes a situation in which only two people communicate. In-person dyads often expand to triads or to small groups. In *Systematic Sociology* (1932), Leopold von Weise classified several dyadic groups. Typical or genuine pairs include sexual pairs, generational pairs and the friendship pair, while atypical or derivative pairs include superior-subordinate (physician-nurse, captain-mate); aider-aided (physician-patient, pastor-parishioner) and teacher-pupil.

In order to be a pair, the affiliation "must have a certain temporal duration" (p. 510). Thus the teacher "does not enter into a *dyadic pattern* with each pupil" through the lecture method in a large lecture class (p. 511). A dyadic pattern is achieved through additional kinds of contact in the teacher-pupil dyad, that which is closer or more personal, such as private office hour conversations or ongoing private electronic communication.

Whether symmetrical or complementary, the dyadic pair is the most prevalent in society, and often serves (although some have argued inappropriately) as a model for many other types of relational communication, including small groups and mass-mediated. Most agree, however, that the dyad is the "most personal" of all possible combinations of people (von Weise, p. 512). The complementary dyad, then, describes a situation in which two people, one in a superior position, the other in an

inferior position, communicate over a certain duration. In this case, where electronic mail substituted for office hour meetings, the dyad changed from a primary to a secondary pair, but still remained complementary.

The personal nature of the dyad did seem to transfer to this electronic situation. Practically all respondents, regardless of whether they were novice or advanced, felt that the instructor's messages were friendly, often funny, very supportive of their work by being helpful, encouraging and enthusiastic. Her quick responses to their messages also indicated to them that she was concerned about their work. Particularly interesting was that many but not all of the respondents felt that her messages reflected her personality, and noted that she appeared to be the same person *in person* that she was on electronic mail. Because of the task-related nature of the electronic assignment, many of the respondents never visited the instructor in her office, and in part because of their positive feelings about her messages, did not care about the elimination of these traditional in-person meetings.

The form of the instructor's mail messages is an interesting determinant of attitudes which falls within the idea of the personal nature of the dyad. Some respondents believed that the instructor's almost exclusive use of lowercase, which she explained was a time-saving text entry measure, made her messages appear very friendly, lent a certain informality to her communication, and represented her personality, as demonstrated below in the comments of three novice respondents. Some respondents felt that this contributed in part to their own openness and informality:

[Her messages] are very much reflective of her. I can see her just typing that right off from the way she lectures. . . . It's funny, because she is a lady that strikes you as being formal and when you get to know her she's not at all, she's very open, so it's [her messages] kind of an open"

Weird. Weird. That's her style and that's fine Also it seems very much like her, she is essentializing what needs to happen. She is cleaning up her act, and mine takes longer. . . .

I thought that she hated to type almost as much as I did. I thought it was probably more efficient. I think it looks informal . . . I like it

Other respondents felt that lowercase was improper, against established rules of writing, "sloppy," and should be avoided. Attitudes among this group ranged from mildly to strongly negative, as demonstrated by the advanced and novice comments below. Negative opinions, however, did not adversely affect any respondent's overall attitudes toward the instructor in her professional capacity or as a person.

All lower case just seems a little sloppy to me, makes me think of E.E. Cummings.

I think it's pretentious. When I see that in printed documents in bothers me. If she wants to be informal she should drop the 'professor.' Using all lowercase is associated with children or with very informal relationships, and if this is informal, it's sort of strange to have the 'professor' although that's how I address her.

On the instructor's use of lowercase, the respondents' opinions were almost evenly divided and there was no discernible difference by rank. For some respondents, then, the appearance of the message contributed to good personal feelings toward the instructor and added to their own informality, while for others it had a temporarily negative impact.

The computerized dyad as an uninterrupted pairing appears to have been very successful for these respondents. Unlike face-to-face dyads, it never became a triad or small group, and it had the distinct advantage over office hour meetings of never being interrupted by a ringing telephone. While sending and reading their electronic

mail, the respondents believed that all of their energies and attentions were focused on communicating with the instructor, as were hers focused on communicating with them.

The idea of only two people communicating, or a private dyad, seems not to have transferred completely from the telephone or letter writing. Some respondents assumed that either computer center staff members or unknown others on the system were regularly reading some or all of their mail. It was unclear how wide they thought this potential audience was, but they did not believe that it affected their communication. It can be argued however, that the dyad is not really a dyad if you believe that others, including this researcher, are actively participating at least as readers of your electronic mail.

General Attitudes

These respondents attitudes on the various aspects of this experience were not always clear-cut. For all, this situation was a new experience with many different factors and some were not always sure about how to interpret their use of electronic mail. Most, however, were reflective and analytical about their experiences during their interviews.

Rank was not a particularly strong factor in whether the respondent liked or did not like electronic mail. Although the respondents who did express the most dislike were all novices, some advanced respondents did have some misgivings, but these were not roundly negative. A few respondents held neutral attitudes about the non-elective use and electronic mail in general, but took the computer assignments seriously.

Ten respondents held positive attitudes about the assigned use of electronic mail and the completion of the various computer tasks, and were favorable about electronic mail as a communications system. Many cited the convenience of time-independent communication, the instructor's quick and direct replies to their messages, and the thoughtfulness of written communication as the most positive aspects. For one respondent, who also corresponded with another instructor in the program, the computer was a very a personal medium, as shown in the first comment below, while others simply thought that sending electronic mail was fun.

Four novice respondents were strongly negative about the entire experience, including the assigned use of electronic mail and the communications system in general. For a few of these respondents, some of this dislike was caused by their inability to edit a message. Two novice respondents resented the computer fee, and one of these sent only 3 messages, the lowest number of messages of all respondents. Another novice respondent did not believe the use of the computer was related to the purpose of the course, but nonetheless sent 17 messages and attempted to complete a variety of the computer tasks. Some felt that electronic mail was a waste of time, and that the same in-person conversation would take five minutes.

The interesting thing about sending mail to my professors is that it gives me a whole new . . . different way to interact with them. Classes are formal, and I hesitate to impose on their time in the hall if they are running back and forth doing something. This allows me to deal with them on a very informal level . . . to get to know them as a person, for them to get to know me as a person. I finished my undergraduate work at State College, very informal, 'David' and 'Linda' and all of that. I find Gotham very very formal, and I am not sure I really love that. I understand the needs for that, but the email allows me to have a completely different kind of communication with them that I really like.

[Electronic mail] has perhaps been one of the lights in the darkness of the City. There is so much work to do, and I don't go out that much, even though I have friends, this is one of my areas of friends.

If I were using it for something worthwhile, if I was going to be writing all my term papers on the DEC, fine, 35 bucks is great, I would have sold the typewriter, you know, but to send mail and participate in a class bulletin board

[Electronic mail] seems sort of a waste of all that computers can do . . . I mean if that's all it were good for . . . I realize I am not exploiting the computer for all it can do

I hate it. It is communication, [but] I prefer person-to-person communication and I cannot yet absorb the computer as a person-to-person communication media.

Almost all of the respondents believed that the use of electronic mail was successful in regard to the completion of the written task, particularly because of the directness and clarity of the instructor's communication which they often cited in their interviews as the most important factor in the task-related communication. Those who needed additional clarification or more information for their term papers did take advantage of office hours and often followed up on these discussions through electronic mail.

Some respondents found this form of written communication to be more thoughtful and reflective, as well as more expressive, more permanent, and generally more complete than oral communication, as evidenced by the remarks of a novice and an advanced respondent, below. But the reflective aspects of written communication were not always there for the novice respondents who could not edit their messages, as demonstrated below:¹⁷

It's nice; you can sort of think out your thoughts and get it on paper, that's the way I do it, put it on paper beforehand and then have it on the screen in front of you and you can go back to it as often as you want. So there are obvious advantages to that. Like. . .you have

17. For another example of novice attitudes about not being able to edit their messages, see also the message of 9 February, p. 30.

it there to refer back to later if you forget something. . .I have read the messages again. . . .

In general I prefer writing to speaking for . . . communication that needs to convey information rather than just sitting around and shooting the breeze with friends. . . . and you can go back and throw in a little grammar here and there, I think you feel more organized.

I really despise the fact that editing was not incredibly easy. When I made a mistake I backspaced until I got to it and then I did it all over again. . . . I *don't* make mistakes. . . .I don't like to make mistakes, and if I catch them in time I'll go back.

Other respondents believed that the loss of immediate interaction found in face-to-face meetings was a detriment, and that electronic mail conveyed less information or expression because of the absence of voice and nonverbal cues. Two novice respondents commented that:

The visits to her office were basically follow up visits, from the messages, additional things that came up. What I found about the electronic mail is that you couldn't carry on a conversation. . . it was that interplay [that was missing] . . . she would mention things in her message and I would write back to her and that would frustrate me because I wanted to have a conversation with her then and there and get it over with. Rather than have me send her a message, she send me a message, me send her another message . . . in a conversation the response is . . . her responses to me would very often provoke more responses to me in my mind and rather than drag this out over a couple of days or a couple of weeks, I think that one trip to her office would have solved everything. In effect, sometimes electronic mail took more time.

In verbal communication, it is much easier to let your vocabulary kind of slide to the more colorful. I was brought up in a very 'writing' world, very formalistic writing world, I went to school with the nuns. I have written essays since the second grade. But in the writing world, there is a vocabulary construct that you don't really go too far out of as it has been imposed upon me. So when I commit anything to either paper or computer, it's more likely to be less graphic [than speech] . . .

Chapter III

Methodology

The total number of students in both library science classes was 33. Fifteen students declined to participate in this research. Of the remaining 18 students, 2 were eventually eliminated from this research. One of these students sent only 2 messages, neither one of which contained paralanguage. She received 2 messages from the instructor, one of which did contain paralanguage. The other student sent 43 messages, and received 35 from the instructor. These two students were eliminated because of the very low and very high number of messages which placed them well outside the range of the other respondents. As a result, 16 students, five men and eleven women, comprised the group of respondents in this research. Between January 21st and May 15th, 1985,¹⁸ 474 mail messages were collected from approximately 30 students and the instructor. Of these, 248 messages, 128 written by the 16 respondents and 120 written by the instructor to these respondents were collected for use in this research.

Permission to undertake this study was first given to the researcher by the instructor, who also presented the project to the students in both classes on February 12th and February 13th, 1985, respectively. The students were informed about the nature of the project and told that their participation was completely voluntary. They also were assured that participation would not be a factor in their final course grades. They were offered the opportunity to withdraw any mail messages sent up to that time as well as to exclude any subsequent messages from

18. Graduation Day.

this research. No messages were withdrawn, and only one subsequent message was omitted by the instructor at one student's request. The respondents were informed that the researcher would interview them and need access to their mail messages to and from the instructor, and that they would have to complete two questionnaires. They also were assured that all aspects of their participation would be kept confidential, and anonymity at all points was guaranteed.

Questionnaires

Electronic Mail Questionnaire

On February 19th and 20th an Electronic Mail Use and Opinion questionnaire (Appendix B, p. 210), was given to the class members by the instructor. At this point, the researcher still had not met any class members. The role of the instructor in helping to start this project was now over regarding direct discussion with class members. She continued, however, to forward the mail messages to the researcher, as explained below. The respondents brought these completed questionnaires to the interview where they were reviewed.

The Electronic Mail Use and Opinion questionnaire contained closed and open ended questions and two rank-order scales.¹⁹ This questionnaire collected information about previous and current professional, personal and educational uses and attitudes about electronic mail, and specific information about how many mail messages were sent during this semester and to whom. Questions also were asked to determine the use and relative success of electronic mail as a substitute for office

19. The rank-order scale for appropriate use of electronic mail, number 10, was adopted from Rice and Case (1983). Because only a few respondents answered it correctly it was omitted from the data analysis.

hour meetings, and what previous behavior was like in this area. In-depth questions were also asked about the use of the electronic mail and the public and class bulletin boards. Opinions about these applications and future uses of computers also were solicited.

Background Questionnaire

A background questionnaire (p. 204), which was completed at the time of the interview, gathered factual information such as age, level of education and time in the program, as well as written communication information, i.e., letter writing activity. Closed and open ended questions, as well as rank-order scales were included. Questions about future uses of computers also were asked. The communication background section was solely concerned with information about U.S. postal mail/letter writing habits.

Consent Form

A consent form (p. 214) was given out at the time of each respondent interview.²⁰ In addition to the statements contained in the consent form, the respondents also were assured during the interview that this information would not be shared or otherwise discussed with the instructor. This was essential to keep the study independent of their class performance and gather truthful opinion, since they were to be graded by the instructor.

20. The consent form was prepared in accordance with Attachment II, Instructions for Preparing Documents and Procedures for Obtaining Informed Consent of Subjects, Teachers College, October 4, 1974.

Anonymity was guaranteed at every point in this research, particularly as it related to the various forms of evidence. The respondents were informed that they would be assigned a pseudonym for their written and oral responses to questions, electronic mail messages, and any on-site observations. Anonymity was also applied to the school, and was modeled on Steinfield's (1983) use of anonymity in a similar electronic mail study.

This degree of anonymity was needed to achieve maximum participation and candid, thoughtful, answers to questions. Although some respondents were unconcerned, many thought that it was better not to be identified in their electronic mail messages. A few respondents insisted on anonymity for all forms of evidence as "protection" against future careers and ongoing attendance in the doctoral program.

Interviews

Respondent Interviews

Electronic mail messages to schedule the interviews were sent by the researcher on February 27, 1985. The same query, written in advance, was sent to each respondent. For those who did not answer the first query, another was sent, and a few respondents were contacted a third time with some success. The first interview took place on March 4, and the last on April 29, 1985.

Interviews were semi-structured. Some were lengthy, ranging from 45 minutes to almost 2 hours, while others were brief, or approximately 15-20 minutes. Attitudes about the computer as a communications medium were probed indepth, although for some this area was of little interest. All interviews were tape recorded with permission and the portions relevant to this research were transcribed.

Interview questions were designed to identify factors relating to expertise such as work locations, and the reasons for the form and content of the electronic mail messages, e.g., the use of paralinguistic features. Paralinguistic features were never referred to formally as such, but rather, individual elements such as exclamations and quotations were identified. Opinions about the form and content of the instructor's messages as well as other types of electronic mail they might have received also were asked. In the first part of the interview, the following areas were discussed independent of the messages themselves:

- amount of time per week spent online
- typing ability
- word locations and types of terminals
- use of the electronic mail application
- completion of the other computer assignments required for the class
- feelings about the researcher reading their messages as a determining factor in their communication

In the second part of the interview, the printout of the respondent's mail was shown to them and used as the basis for questions about the form and content of the messages. Comments made about specific messages were transcribed as a part of the interview. Questions about the mail messages included:

- the presence or absence of salutations and closings
- the use/lack of carriage returns
- the use of paralanguage, punctuation, and linguistic features
- content of the messages
- the success of the message/the success of the instructor's message for task completion
- feelings at the time the message was written
- opinions about the appearance of the instructor's messages and other mail
- computer problems that may account for the appearance of the messages
- typographical errors and related problems
- formatting problems

Instructor Interview

An interview was conducted with the instructor on May 8, 1985, after the grades were officially entered. No attempt was made by this researcher to discover individual performance. The interview was tape recorded with permission and was transcribed in its entirety. It covered the following areas:

- background; previous experience with these courses
- previous educational use of electronic mail
- opinions about current use of electronic mail as a non-elective assignment
- perception of the students' attitudes about the use of the computer
- considerations of the campus computing facilities
- relationship with computer center staff
- assignments using the computer
- documentation and technical material supplied to respondents
- technical lectures/technical questions
- perception of message distribution (task-related, personal, etc.)
- background and opinion on office hour meetings and changes this semester
- opinions on the differences between office hour conversations and electronic mail messages for the completion of the project
- differences in getting to know the students face-to-face and online
- completion of assignments
- references to electronic mail messages in class discussion
- the form of the instructor's messages
- opinions about the appearance of the students' messages
- students known before and not known before
- overall success or failure of electronic mail

Primary Written Evidence: Electronic Mail Messages

Two types of electronic messages were available for this study. The private electronic mail messages to and from the students and the instructor, and the semi-public class bulletin board messages. Both types of messages were collected. Since less than half a dozen messages were sent to the class bulletin board they were not included in this research.

Computer Accounts

Classes at the University began on January 21st, 1985. Computer accounts took between 5-10 days to be entered on the systems. Respondent accounts or IDs were on three separate DEC-20 systems, designated A, C and D, networked through DECnet for mail and file transfer. The instructor's account was on the A machine, and the respondents were contacted initially by the researcher from this computer.²¹

Message Collection

With the exception of approximately a dozen messages sent early in the semester, and perhaps half as many sent during the time of this research, the instructor saved all of the mail sent to her as well as her replies. The first student mail message which was saved by the instructor was January 29, 1985; the first instructor reply was February 4th. The last student and instructor messages were May 7th.

As the messages were received by the instructor, she forwarded them to the researcher's computer account. She often used the blind carbon copy facility to automatically send copies of her replies to the researcher.²² The instructor almost always signed on to the machine each day to read the class mail, and therefore

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21. In the middle of the semester, the instructor decided to experiment with a computer conferencing system. As a result, all student IDs were moved to the DEC-20 A machine. This caused some problems for respondents whose passwords were changed in the process of being moved, and who had to be re-established on a new machine, but the inconvenience was minor. The change in machines had little or no technical impact on mail delivery and since all machines were configured identically, the change was transparent to the respondent. The computer conferencing system was not used due to lack of support from the computer center.
 22. The Blind Carbon Copy (BCC) facility sends an exact or "carbon" copy of the message to another user on the system without any indication to the main recipient. It is the same principle as the traditional paper blind carbon copy.

collection was a daily and often twice daily activity. Usually each day there were a dozen messages to the instructor and her subsequent replies.

This data collection procedure, which did not require any student participation, effectively kept the researcher in the background of the communication between the students and the instructor. Further, the researcher did not meet any of the respondents until the interview, since the project was presented by the instructor and subsequently all interviews were scheduled through electronic mail. Thus the researcher maintained an electronic but not a physical presence: the former was enough to accomplish many tasks related to this research and perhaps was not as obtrusive as the latter. Interview data supports the idea that all of these factors combined to promote a typical or natural communication since many respondents "forgot" that the researcher was "there" or did not care that their mail was being read. The interviews, however, undoubtedly had some affect on the respondents' communication, although this was variable. For some respondents, the interview came before most of their mail was sent, for some it came in the middle, and for still others it came at the very end of their communication with the instructor. It was clear however that no respondent underwent any substantial changes in either the form or content of their messages after their interviews.

All electronic mail messages were initially collected by the researcher into four different files, divided first by the sender and second by the time period:

1. Pre-Class-Mail: Student messages sent before the study was announced.
2. Pre-Teacher-Replies: Instructor messages sent before the study was announced.²³
3. Post-Class-Mail: Student messages sent after the study was announced.
4. Post-Teacher-Replies: Instructor messages sent after the study was announced.²⁴

Further Organization of the Mail Message Files

Prior to each respondent interview, the student-instructor electronic correspondence was compiled for each respondent by extracting from the four mail texts listed above the mail messages in chronological/paired order or, in the order of the original message(s) and the subsequent response(s).²⁵ Where the student sent two or three messages in a row before getting a reply,²⁶ or the instructor replied to two or three messages sent earlier, the original messages were paired as closely as possible with the responses. The original message, however, established the primary order or chronology.

Messages extracted in this fashion from the four base mail texts were saved in a file under the respondent's name so that each set of student-instructor messages was separated into 16 different files. Paired messages and replies were kept together on one page as much as possible. These were printed to accommodate the width of the text, reviewed by the researcher before the interview and marked to show the

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23. This file and the Pre-Class Mail.txt were closed on February 12th and 13th.
 24. This file and the Post-Class-Mail.Txt file were added to daily from the date the study was announced until May 15th, on which date they were closed.
 25. Whether the first or original message or messages in a sequence was from the instructor or student was not always of consequence since not all messages are extant.
 26. This situation should not imply that the instructor did not promptly answer all mail sent to her. Two or more messages in a row sent by a student were composed within minutes of one another, but this did not occur very often.

areas of interest, and finally shown to the respondent during the interview. No attempt was made to code the messages for analysis at that point. Eventually, each set of student-instructor correspondence was divided into three sections: before the study was announced, after the study was announced, and after the interview was completed to the end of the study.

These files were used to 1) classify the messages into content categories by rank, task and time 2) code the messages for paralinguistic features, and 3) provide the complete raw data for QUERY, the content analysis program.

Content Analysis Categories

The electronic mail messages were categorized first by the rank or expertise of the respondent, second by the task, and third by the time the message was sent.

Rank of Respondent Categories

There were two categories of rank, novice and advanced. The means by which these categories were determined and how each respondent was classified is explained on p. 14.

Type Categories

Despite the repetitive nature of many content analysis studies, throughout the history and development of the technique there is a distinct absence of standard categories. Many scholars have, however, used categories developed originally for other studies and applied them again to the same type of research, and still others have applied categories from one type of medium to other channels.

This is particularly true of Bales' (1950) twelve interactional process analysis categories. Developed for the "general purpose" observation and analysis of face-to-face small group interaction, these categories have enjoyed wide application for small group and other types of communication, and have recently been adopted for computer-mediated communication, particularly computer conferencing (Hiltz, 1978; Hiltz et al., 1980; Rice & Love, 1987). Rice and Love expanded Bales' twelve categories by two, that of giving and asking for personal information.

Categories for this research were formulated using Bales' theories and principles as guides and based on the similar use of these categories by Rice and Love for computer conferencing. Specific message categories were:

- 1.0 Giving Computer Task Related Information
- 1.1 Asking for Computer Task Related Information
- 2.0 Giving Written Task Related Information
- 2.1 Asking for Written Task Related Information
- 3.0 Giving General Class information
- 4.0 Personal
- 5.0 Other

The choice of the main categories (1.0-3.0) by function and subject matter was determined by the original task related purpose of the communication. The respondents were required to communicate about their assignments, which involved giving and asking for information, both about their own work and about matters of a general class nature. The division of categories by written and computer tasks further reflected the two types of assignments.

Not all of the communication concerned the tasks, however. The Personal category was created to classify the non-task related or personal information which

was exchanged between the students and the instructor during the semester. These messages were not classified by giving and asking for personal information since few were that clearly delineated. Personal messages were notable for their mutual sharing of information and for the absence of specific questions and answers. The last category, Other, was a general category used for messages which were not classified into any of the above.

Sentences, used as the unit of analysis, were counted and classified by content to determine into which category the message should be placed (Rice & Love, 1985, 1987). Mail message subject headers were used as context units to provide for the broader interpretation of the unit of analysis.

Messages were further classified into subcategories by kind, i.e., initiating messages or replies. Electronic mail which initiated a communication was classified as a message. Electronic mail in answer to a communication was classified as a reply.²⁷ In most cases, the use of MM's reply-to-sender option clearly indicated within the mail header that the communication was a reply, but this could be misleading if the content of the message was not examined and the expertise of the respondent was not fully known.

Because not all of respondents knew how to use the reply-to-sender option, an actual reply would not always be clearly indicated as such in the mail header. Conversely, some respondents, including the instructor, frequently used the reply-to-sender option as a convenience,²⁸ and therefore while technically their mail was a "reply" to an earlier message, the content was unrelated and it really was a

27. Both messages and replies are referred to generically throughout this research as messages unless otherwise indicated.

28. It was easier to reply-to-sender than to begin a new message since this option automatically supplied the recipient's ID name.

completely new message. Only by examining the content could this subcategory be accurately determined. In these situations, then, mail messages which were clearly replies but not indicated as such in the mail header were classified as replies. Mail messages which were new communications but indicated technically as replies in the mail header were classified as messages.

The respondents' electronic mail was classified into both messages and replies. The total number of respondent messages was 128, of which 92 were messages and 36 were replies. Novice respondents sent 59 messages and 24 replies, and advanced respondents sent 33 messages and 12 replies. The instructor did not initiate any communication because of the nature of the assignment. All of her electronic mail, 120 messages, were classified as replies. Instructor-novice replies were 78, and instructor-advanced replies were 42.

Time Categories

Messages were further classified according to the time they were sent in relation to this study. This was easily determined by the date stamp on each message. The three categories were:

1. Pre-Announcement Mail: Mail sent and received before the study was announced.
2. Pre-Interview Mail: Mail sent and received before the respondent interview.
3. Post-Interview Mail: Mail sent and received after the respondent interview.

Identifying and Coding Paralinguistic Features

The context for all of the paralinguistic and related features, which was a key to understanding how and why they were used, was determined first by reading the

entire message for form and content, then by noting the occurrences of paralinguistic features throughout, and last by examining the text around a particular feature or group of features. As Carey (1980) observed, a paralinguistic feature can mark one word, a sentence, or the entire message. Thus the amount of text needed as a reasonable measure of context, and therefore of content, varied considerably. Adequate context for any paralinguistic feature might include one sentence, two paragraphs, or the entire message.

The paralinguistic features in each message were identified according to the criteria developed by this researcher, as explained beginning on p. 119, based initially on Carey's identifications. They were coded literally, e.g., quotations, ellipses, exclamation, etc. and paired with the text of the message to which they related. Where slightly more complex paralinguistic features were identified, particularly vocal spellings, lexical surrogates, vocal segregates and spatial arrays, they also were coded literally and paired with the text. Many of these basic identifications were further qualified by specific coding narrative descriptions to elucidate the combinations and relationships between different kinds of features.

As demonstrated in A, below, these more precise coding descriptions were necessary when punctuation, particularly parentheses and quotations, could and did include other features, such as questions marks and exclamation points as well as text. In these cases identification was considered within the main set of the paralinguistic feature which was most prominent within that context, usually the punctuation which held other features.

The relationship between features which were more separate or distinct than those described above also had to be shown. Some features may have followed one

another directly, while others were physically separated. In either case only the context could determine if they were related or unrelated, as demonstrated in B.

Single occurrences of paralinguistic features did not present these types of problems. Simple multiple occurrences were indicated by plurals, as demonstrated in C.

Coding Descriptions for Paralinguistic Features

Example	Coding Description and Explanation
A.	
(?) or (!)	Question mark <i>inside</i> parentheses, or, exclamation point <i>inside</i> parentheses. Punctuation contained <i>alone inside</i> the parentheses or quotations.
(what!) or (what??)	Parentheses <i>and</i> exclamation, or parentheses <i>and</i> question marks. When multiple elements appeared one right after the other within another larger feature but were not alone inside the feature.
B.	
...! or ?!	Ellipses <i>and</i> exclamation or question mark <i>and</i> exclamation. When any two features followed one right after the other. Multiples were indicated by plurals.
it IS very possible!	Capitals <i>and</i> exclamation. When one form closely followed the other so as to be a part of the same sentence or thought.
"unlikely" but ok!	Quotations <i>followed</i> by exclamation. When the features came within the same sentence or paragraph but did not follow one another immediately and therefore were not clearly related to the same thought.
C.	
HELP	Capitals. When all letters of a regular word were capitalized or uppercased.

More explicit paralinguistic features were coded appropriately and paired with related text, particularly vocal segregates, and vocal spellings, e.g. *vocal spelling/hullo*. Special symbols or spatial arrays, e.g., ****** and *:-)* which appeared only a few times were identified as such and paired with the text, e.g., *special symbol/*****.

Features of the electronic mail communication other than paralanguage also were coded. Salutations, closings, signatures and postscripts were coded literally, and began with the appropriate label, e.g. *salutation/hello*. The designation "salutation" was any opening which began the message, positioned before the body of the message. When any of these features were accompanied by a paralinguistic element, the individual element was identified literally in the description. The designation "closing" was anything which stood in place of the formal or more traditional letter closing, e.g., *sincerely yours* or, *yours truly*. All but one of these closings were actually pre-closings in the traditional sense of a letter, e.g., "see you tomorrow" or "thanks very much." Text was interpreted as a closing if it a) appeared at or near the end of the message, above the signature, and b) contained some personal reference and/or signaled the end of the subject of the message, and c) made reference to either the sender or recipient prior to the signature.

Similarly, the designation "signature" was anything which stood in place of a formal or traditional signature, since signatures are traditionally defined as handwritten. The term signature, then, indicated that the sender keyed his or her name at the end of the message. Signatures were further identified by first name only, full name, ID name, and various other combinations.

Features Not Analyzed

Punctuation marks or other features which were not paralinguistic, or where not used in a paralinguistic sense, were not coded. Periods and commas were never coded. Other features not coded were:

Capital letters/uppercasing: Used for proper names, book and article titles or for system commands.²⁹

Colons: Used as a linguistic pause or stop.

Parentheses: Indicated only linguistic pauses since commas could be used as an appropriate substitute. In many of these situations parentheses were grammatically incorrect. They were recognized as paralinguistic if they contained other paralinguistic features, e.g., (!), (?) as explained above.

Single Question Mark: Which was used as a linguistic device. A single question mark was identified as paralinguistic when it appeared inside another form of punctuation such as quotations or parentheses, e.g., (?). Multiple question marks were identified in all cases.

QUERY: Qualitative Content Analysis Program

Retrieving and Analyzing Electronically Written Text

QUERY, a versatile qualitative content analysis program, was designed and written specifically for this research by Barbara E. Moo, AT&T Information Systems, Summit, New Jersey, and Andrew R. Koenig, Bell Laboratories, Murray Hill, New Jersey. Written in C, QUERY runs on the IBM XT or AT systems. QUERY has many advantages over the General Inquirer and similar programs for this type of research. It is particularly well-suited for qualitative content analyses

29. System commands were represented in a variety of ways, usually uppercased or with the first letter capitalized, as in a proper name. Few respondents knew how system commands are actually written, but there is no one standard in technical documentation (Asteroff, 1985b).

because of its flexibility in indexing and retrieving written text for contextual interpretation. Unlike other systems, QUERY has no limit on the size of text to be retrieved. However, QUERY does not perform automatic lookups or analysis. Samples of QUERY's raw data and processed files appear in Appendix B, p. 215.

Theoretical Design. Because of the close collaboration between the programmers/designers and the researcher, QUERY allows for maximum flexibility in creating and manipulating the analysis and display of content categories and paralinguistic features. It analyzes each message and displays information in the basic hierarchy of:

Content Category
Keywords
Text

where the **Content Category** is the rank of the respondent, the type of communication, and the time of the communication, the **Keywords** are the coding identifications of individual paralinguistic features or other elements, and the **Text** is the actual feature and the surrounding text. Data can be analyzed with any of the three choices within the content categories, that is, rank, type and time, sorted in any order. In the actual messages, keywords and their associated text are displayed as parts of the content categories. See Appendix B for examples.

Data Selection. QUERY uses and, or and not operators (& | ~) to enable various selections from the files. These apply to each content category (rank, type and time) and also to the keywords. The combinations of selections are numerous, e.g., Student Reply Novice and Giving Task Related Information with Ellipses. The messages which fill these requirements are selected with the identified text displayed and various reports produced at the end of the program. Selections cannot be made

by message length. If a specific selection is not indicated, all messages and keywords are selected.

Report Production. In its final report generation,³⁰ QUERY tabulates the total number of messages, the total number of characters in the messages,³¹ and the keywords associated with rank, type and time of the message. Grand totals are produced for all of the above. Finally, by inserting certain delimiters in the header information, the sender, recipient, date, subject, and other header information is recorded automatically and displayed. This produces a separate listing associated with the standard electronic mail features. See Appendix B for examples.

Coding Content Categories

The primary identifications of rank, type and time were determined from the criteria explained above. Messages and replies, the type of communication, and the time it was sent in relation to the study were indicated at the front of each message. Messages were then selected, as needed, according to various combinations of these categories.

Coding and Selecting Paralanguage

Coding the messages for paralinguistic features and other elements was completed by identifying with keywords each element and its associated text with

30. As demonstrated on p. 219

31. The character count is only of the individual characters, not the spaces between words and/or characters or the spaces at the end of each line. Thus the number is likely to be smaller than character counts of programs which count these spaces, but is nonetheless accurate. Characters found in the mail headers, as well as keywords, are not counted, but all other characters in the messages, whether tagged or not, are counted.

braces and square brackets. This could include any part of the message designated as a unit such as sentences, phrases, headings, salutations, and closings. Word counts are made through this procedure. The keyword is placed within the braces and the text associated with it in brackets, e.g., {Salutation} [Hi There!]. These are then output as part of the report. A coded file would appear as:

{salutation/hello again/exclamation}

[Hello again!]

{capitals}

[I think there is some question about my topic. I don't think I was very clear about it. I KNOW I was not very clear.] Anyhow . . .

Messages containing paralinguistic features identified with keywords were selected by indicating them in QUERY's KEY field. If only one paralinguistic feature was indicated in the KEY field with all other fields left blank, all messages in which that feature appeared is selected. If other criteria were also applied, e.g., student novice messages *and* questions marks, then only those messages which met both criteria were selected.

Each message without paralanguage was coded to contain the keywords {NO PL}. This allowed for the important total selection of messages with and without paralanguage. Indicating ~NO PL (NOT no paralanguage) selected all messages *with* paralanguage; simply indicating NO PL selected all messages *without* paralanguage.

Respondent Profiles

The data collected from the questionnaires, interviews, and QUERY reports comprised the respondent profile for each student. These profiles included:

- assigned pseudonym;
- the total number of messages sent and received;
- their distribution over the three times periods;
- notation about other kinds of mail sent;
- evaluation of the level of computer expertise;
- other pertinent information about the use of the facilities;
- an evaluation of the appearance of the messages;
- the coded mail messages, and
- the final QUERY reports.

Chapter IV

Literature Review

Background

Computer-mediated communication scholarship explores human communication via computer in many different areas: education, business, research, the sciences, and politics to name just a few. This wide-ranging scholarship makes use of a variety of analytical approaches including general communications, sociological, cultural, social psychological, organizational and economic analyses, and technical assessments.

Like most scholarship, the development of social science computer-mediated communication research has followed an evolutionary path. A general evolutionary development model for humanities and social science literature can be conceptualized as: exploratory periodical literature; wide-ranging general explorations covering many subjects using traditional or innovative methodologies; smaller, specific analyses of subject areas taken from general works using refined or different methodologies; synthesis; consensus; revision; plateau; new subject areas and/or radically new methodologies applied to traditional subjects; new synthesis; new consensus; post-revisionism, *ad infinitum*. In some content areas, one or more of these stages are less important than in others, or sometimes are absent altogether, while in others slightly different stages may occur. Still, as a general model of the evolutionary development of scholarly literature, this progression can be seen in many different areas of inquiry.

The social science scholarship concerned with interpersonal computer-mediated communication, which began about fifteen years ago, has evolved through the second stage, and since the late 1970's is positioned in the third stage: smaller, specific analyses of subject areas taken from general works, with refined or different methodologies. Since human communication via computer is not even two decades old, social science research is very much in its infancy, and scholars continue to probe and test its practical, theoretical, technical and methodological limits. Conversely, technical literature in computer-mediated communication, which first appeared in the late 1960's with the actual development of electronic mail, is abundant. Yet the volume and variety of social science literature in this field is impressive given this relatively brief period of development.

As would be expected, but for unique reasons, the university has played an important role in the development of computer-mediated communications research. The university was and is currently a dichotomous setting for this area: the university scientific research community assumed a major role in the technical development of the electronic mail systems, and this subsequently provided social science scholars with a ready-made area of study within their own universities.

Social science scholarship became feasible when the uses and users of computer-mediated communication systems--both within and outside the university--began to change. In the late 1970's and early 1980's computer-mediated communication systems became popular among those outside of the hard sciences: students and faculty in the humanities and social sciences as well as university staff members began to use electronic mail and bulletin boards as general communication systems. This new user community spurred social science inquiry, and many of these users became research subjects in this area. But university

researchers were not and are not now in sole possession of either technical or social science research, nor is the university community the only research population. Those at private institutions, corporations, and research and development laboratories also play a critical role in the development and understanding of computer-mediated communication systems in both the public and private sectors.

The first major works in computer-mediated communication, which appeared in the early to mid-1970's, used a variety of old and new methodologies to explore this brand new medium. Current research has evolved from these earlier general works to what can now be characterized as detailed analyses of specific areas. The versatility of the computer and its communications systems has encouraged study in many different kinds of situations including controlled experiments, field trials, laboratory tests, and practical applications. The many methodologies applied to these situations include quantitative and qualitative content analysis, discourse analysis, network analysis, ethnography and instructional evaluation. Since no field develops in isolation, it is important to note that computer-mediated communication research has often paralleled and benefited from work in many areas of mediated communication, mass communication, interpersonal communication, written communication and discourse analysis.

If computer-mediated communication research follows a typical evolutionary path, and if the technology stabilizes sufficiently, at least one synthesis of the area should appear by the end of this decade. In addition, periodicals and collections, now the predominant form of publication, should in the coming years be balanced by the appearance of monographic literature.

Recent studies of computer-mediated communication focus on the social and behavioral aspects of interpersonal communication and how they relate to the characteristics of the medium, the individual communications system, the nature of the communication, and the communicative situation. This includes how individuals adapt within different computing environments, what differences, if any, exist between those with computer experience and those without, how communication in dyads differs from small and large groups, how interactive communication differs from delayed communication, and what changes occur when communication is personal or task-related.

Within these areas, which all have an extremely wide latitude, analyses often are based on measures of communication efficiency and appropriateness in decision-making, interpretations of language content, and the types and frequency of messaging. Researchers utilize comparisons to different media, especially comparisons to face-to-face communication. Through this approach, they reference and analyze the narrowness of the bandwidth and the lack of redundancy, especially the absence of nonverbal and spoken paralinguistic cues. In the last five years, the general trend in computer-mediated communication research has been the quantitative analysis of delayed group communication, particularly computer conferencing systems.³² Regardless of the content area, all of these studies make use of more than one methodology. Almost all of this research includes some kind of content analysis of the transcript, and frequently interviews and questionnaires, and less often audio and video taping and on-site observations.

32. Perhaps computer conferencing studies are more popular than studies of electronic mail because the group transcripts of the former are more easily obtainable than the private and often personal record of the latter.

As will be shown in the following analyses, the evolution of computer-mediated communication scholarship has been from the general to the specific. The subjects and methodologies in this third or current stage of the literature are much more focused than those found in the exploratory general works which characterized the second stage. Although computer-mediated communication research does not yet appear to be ready for synthesis and may be even further from consensus, it is clear that the goal of all of these scholars has been to identify and interpret the various characteristics of human communication via computer, and to situate this new form within the larger context of human communication.

General Works

In 1974, Jacques Vallee and Robert Johansen of the Institute for the Future, with several co-authors, released the first two volumes of a four volume study on *Group Communication Through Computers* (1974, 1975, 1978). These reports of research were the first major studies of computer-mediated group communication, although both Vallee and Johansen, as well as others in the field, most notably Murray Turoff, had published periodical literature before this time. The research at the Institute for the Future was based solely on computer conferencing: the use of the FORUM computer conferencing system developed at the Institute for the Future, and PLANET, its commercial successor. Funded by the National Science Foundation, these research reports were published by the Institute for the Future. The scope of this work was best described in *Pragmatics and Dynamics*, (Vol. 3, 1975):

Over the past three years, the Institute for the Future has engaged in the development and analysis of a new medium of communication known as computer conferencing. The *theoretical* aspects have included research into advanced file structures that could be shared in real time, the analysis of synchronous and asynchronous group interaction on a computer network (ARPANET), the formulation of a taxonomy for electronic group communication, and the development of social evaluation procedures. The *operational* research has involved the design and implementation of a full-scale computer-based conferencing system called FORUM, the compilation of a data base of user performance statistics and user reactions, and the development of training and facilitation procedures. (p. 3)

Within these volumes is contained a wide variety of approaches for the study of computer-mediated communication: many are still used by scholars and none have as yet been exhausted as research methodologies. Particularly relevant to communications studies is Volume 2, *A Study of Social Effects* (1974), which demonstrates the research methodologies and measurement techniques used for FORUM. This volume includes in-depth analyses of cross-media experiments, traditional and electronic group communication, user behavior, and several different kinds of content analyses of conference transcripts.

Two observations made by Vallee and Johansen are particularly important for later research. In the area of cross-media research they wrote that "One needs to exhibit great care in . . . comparisons [to face-to-face communication] because telecommunications media are not necessarily surrogates for face-to-face patterns. It seems more likely that each medium has its own inherent characteristics which should not be expected to mimic face-to-face patterns" (1974, p. 4). In the choice of the type of communication used for comparison, they observed that "extrapolation from dyadic patterns to group patterns . . . is questionable. The principles simply cannot be assumed to be transferable" (p. 20). Thus research models should be built on the form of communication closest to what is being studied.

Vallee and Johansen identified FORUM's basic characteristics and then developed measurement techniques as assessment tools. These included statistics (system-generated data), context-related measures (content analysis), and user behavior (user logs, questionnaires, and user profiles). The availability of conference transcripts was a central part of their research, which they analyzed primarily through content analysis methodologies. Conference transcripts accommodated three different kinds of content analysis procedures: general content analysis, topic and interactive thread analysis, and semantic analysis. All of these would be undertaken at various levels by later scholars and would reflect the growth of scholarship in these areas as well as the development of more sophisticated computer-based content analysis programs.

Content categories for general message classification included problem-solving information, information exchange, and general discussion. Within each, messages were classified as either dyadic or group-oriented. Topic and interactive thread analysis, a much newer procedure at that time than general content analysis, involved the tracing of specific themes as they evolved over the course of the conference.

The semantic analysis of the conference transcripts allowed Vallee and Johansen to identify some of the characteristics of communication which resulted from this bandwidth. Particularly, they used this analysis to understand the changes brought to communication because of the absence of nonverbal and paralinguistic cues, and to interpret the types of emotional or interpersonal communication taking place through FORUM. They concluded that many emotional or interpersonal messages disappear because the medium is impersonal:

One of the most important concerns about FORUM . . . is the loss of those nonlinguistic communications which accompany face-to-face meetings. FORUM conferences are entirely in the written mode; there are no paralinguistic vocal cues--such as pitch, intonation, pauses, or stress--nor are there physical presence cues such as facial expression, posture or movement. In face-to-face communication, some of these cues are very important in regulating the interaction and flow of the discussion. Others are used in communicating messages of emotional feelings and attitudes toward other participants. In FORUM, some of these messages do get translated into written forms--'This terminal is ugly!' or 'Let's move on to the next topic.' However, there is a distinct narrowing of what is transmitted, and many emotional, interpersonal messages disappear. It may be, of course, that such messages are not always necessary to discussion. But when the only context for 'meeting' a person is an impersonal keyboard and an equally impersonal terminal printout, the personalities of the users might seem inaccessible." (p. 79)

The semantic analysis broadened the content analysis technique to include the characteristics of the FORUM system, particularly the ideas of editing an entry, the subject matter of the conference, and the physical requirements of the system.

Editing an entry before submitting it to a conference indicated that the researchers "are not necessarily reading a spontaneous comment. Instead, there may be several layers of revision based on the writer's wish to clarify, add evidence, impress himself, impress others, protect himself, or take into account the reactions of other participants. Editing also occurs in face-to-face communication, but it is internal" (p. 83).

The idea of a subject-oriented conference may increase "pressure on the participants to stick to the topic" (p. 83). This also affects the number of personal messages participants will send, as well as the tone of a message: "In an open, many-participant, subject-labeled conference, there will likely be constraints pressing towards formality, logical consistence, and lack of emotionally-toned messages" (p. 83).

Finally, the physical aspects of the system and computer terminal "require some adjustment on the part of the user, and until he feels comfortable, he is likely to be self conscious and perhaps hesitant in his entries. In the same manner, if typing itself is slow or of there is a self-consciousness regarding it, then we would expect entries to be more selective, less frequent, and also shorter, and so not necessarily reflective of the total reactions of the participant" (p. 83).

The work of the Communications Studies Group (CSG) of University College, London, took place at the same time as the research at the Institute for the Future (1970-1976), although the CSG was concerned with more traditional audio and video technologies. Their research, published in book-form as *The Social Psychology of Telecommunications* (Short, Williams & Christie, 1976), was the culmination of their "comprehensive research programs comparing the relative merits of different media for a variety of tasks." Their study of "person-to-person telecommunications" involved "groups of people engaged in carefully designed tasks either face to face or via telecommunications media of various kinds, including the telephone, loudspeaking audio and closed circuit TV" (Champness, 1981, p. 5). The research of the CSG influenced the development of computer-mediated communication scholarship, especially in the area of task-related communication and its role in electronic interpersonal relationships.

One of the most important concepts developed by the CSG was the idea of Social Presence, or "the degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationships" (p. 65). Short, Williams and Christie believed that Social Presence was "a quality of the communications medium" itself (p. 65). Its importance could be seen in how it affected the ways in which "individuals perceive their discussions, and their relationships to the persons

with whom they are communicating" (p. 65). They applied the idea of Social Presence directly to the type and effectiveness of communication which people undertook as it related to a given technology: "the users of any given communications medium are in some sense aware of the degree of Social Presence of the medium and tend to avoid using the medium for certain types of interactions; specifically, interactions requiring a higher degree of Social Presence than they perceive the medium to have" (p. 65).

Shortly after the research of the CSG was completed, the first commercially-published general work on computer-mediated communication appeared: Starr Roxanne Hiltz and Murray Turoff's *The Network Nation: Human Communication via Computer* (1978). Both of these authors had published periodical literature before this time, and Turoff had developed the first computer conferencing system in 1970.³³ A wide-ranging survey of the field which outlined many research areas for later scholars, *The Network Nation* included technological assessments and sociological and psychological interpretations of computer conferencing in education, computer science and business. Both of the authors specialize in group communication through computers, particularly the computer conferencing system EIES,³⁴ written and developed by Turoff and maintained by Turoff (a computer scientist) and Hiltz (a sociologist). They explored different kinds of computer-mediated communication systems, including electronic mail and bulletin boards, but like Vallee and Johansen, their main focus was on group communication.

33. EMISARI was developed for the Office of Emergency Preparedness, Office of the President of the United States.

34. Electronic Information Exchange System.

In their investigations of the many aspects of computer-mediated communication, Hiltz and Turoff compared the characteristics of the computer to face-to-face communication as a means of analyzing what is taking place in a computer conference. In their attempt to understand the impact of the narrowing of the channel, they explored several characteristics of face-to-face communication, which included the basic understanding that in face-to-face communication "a person simultaneously receives information through many channels, which may be broken down into the audible channels and the visual channels" (p. 76). Audio channels contain "both the actual words used and their arrangement, as well as what might be called 'vocalizations.' The visual channels may be broken down into facial expressions, clothes and other aspects of general 'appearance' that give status cues, body movements, and psychophysiological responses" (p. 78). They described language content as having both manifest (direct) and latent (indirect) meanings. Vocalizations [spoken paralanguage] were described as "all the 'nonwords' or sounds that accompany the delivery of the words or are used as interjections rather than for their manifest meaning" (p. 78).

They analyzed visual information in face-to-face communication, which provide filtering for each communicant, as height, weight, and "other culturally determined aspects of 'attractiveness'" as well as the clothes, makeup and jewelry "used by persons to present themselves to others" (p. 78). Facial expressions, such as smiles and frowns "are for the most part the primary source of information about the feelings or attitudes of the person behind the face" (p. 79). Eye contact was seen as a critical determinant of the pattern of interaction in face-to-face communication, including the regulation of the interaction (p. 80). Body movement, defined as "gestures that are substitutes for words" was interpreted as providing

emphasis to speech, and as attempts to illustrate "meaning or denote emotion or feeling" and as mechanisms for regulating the conversation (p. 80).

Hiltz and Turoff found that one important consideration in the absence of these characteristics in computer-mediated forms is the level of experience of the computer user. Specifically, their analyses of EIES experiments indicated that one major difference in how users compensated for the absence of these characteristics was due to the level of experience: that more experienced users had a set of cues for computer-mediated communication culled from their use of the medium, whereas new or inexperienced users did not:

The beginning user of a computer-mediated written form of communication is usually most conscious that all the kinds of cues just listed are *missing*, and has an initial tendency to try to ascertain some of these cues by supplementing the written channel with a visit or telephone call. As the user becomes more practiced, however, there is the development of skills peculiar to this medium and the recognition that it has many potential advantages.

What happens to new users, without their conscious recognition in most cases, is that they are faced with a kind of 'culture shock' in which all of the very complex 'rules' for combining the various kinds of communications channels described earlier do not work, because the nonverbal channels are missing, there are some new channels or means of communication available, and the rules or possibilities for using the written equivalent of the spoken verbal channel work differently. (p. 81)

As a result of the absence of verbal and nonverbal cues, Hiltz and Turoff found that "a new system of 'conventions and procedural rules' emerges among the participants, who must master them as well as the mechanics of the system before they feel comfortable and accomplished in this medium" (p. 82).

One positive factor expressed by experienced or practiced users was that because the communication was written, and allowed for the time to revise and

review, the content was more fully thought out than would be possible in face-to-face communication. Hiltz and Turoff attributed part of this "better-organized content" to the actual form of the message, that "written communication introduces a visual channel. The use of indentation and numbering can help a person in following a complex argument" and "pictures can be drawn using terminal characteristics" (p. 83). They concluded that "as conferees become more familiar with the visual presentation techniques that may be utilized, they tend to become quite skilled at adding visual components to their text" (p. 83).

Expanding their analysis of experience as a determinant of effective communication, Hiltz and Turoff also interpreted the role of written vocalizations [electronic paralanguage] or, "substitutes to replace some of the cues and information normally transmitted by vocalization or by nonverbal channels" (p. 90). Instead of a head nod, a computer user might send the actual message, "I agree with you." Experienced users, however, make better use of the "visual channel" than do other users: "accomplished users often insert written descriptions of cues or emotions to provide the proper context or make an emotion point. For example, among the equivalent of vocalizations that have been embedded in messages sent on EIES are 'HA! HA!,' '(giggle)' and 'Boo Hoo'" (p.90). On the absence of verbal and nonverbal cues and the impact on written vocalizations in computer conferencing, Hiltz and Turoff concluded that "unless supplementary forms of communication are used, however, most of the nonverbal content is lost, for better or for worse" (p. 90).

Specialized Studies

Group, Task, and Behavior

Scholars began to build on these general works through more specific analyses of computer-mediated group communication, and these specialized studies characterize the current stage of research. In two cross-media studies, Hiltz et al. (1978, 1980), applied Bales' (1950) popular twelve Interactional Process Analysis categories to compare face-to-face group communication to computer-mediated group communication.³⁵ In field trials conducted for "Controlled Experiments with Computerized Conferencing" (1978), Hiltz found that when compared to face-to-face discussion there was less quantity of communication in computer conferencing and more time was needed to reach a decision. However, the computer conference had greater quality of participation and most significantly was characterized by "tendencies toward overt sociability . . . and a 'letting down'" of a public image or face-maintaining behavior when the user was "alone" with the computer.

Hiltz also used Bales' categories in "The Process of Communication in Face to Face vs. Computerized Conferences," a paper written with Kenneth Johnson and Anne Marie Rabke and presented at the 1980 Conference of the Association for Computational Linguistics at the University of Pennsylvania. They quantified the decision-making process in face-to-face and computer conferencing communication using the Interactional Process Analysis categories in controlled laboratory experiments. Important differences found in the two modes included a tendency for more suggestions about the task, and, much more solidarity in the computer

35. Bales' categories also were used in *The Network Nation*.

conferences, while significantly more tension release was exhibited in the face-to-face conferences.

Paralanguage in Computer-Mediated Communication

Another paper which analyzed a specific aspect of computer-mediated communication also was presented at the Conference of the Association for Computational Linguistics. John Carey's "Paralanguage in Computer Mediated Communication" (1980) explored the role of paralanguage in two computer conferencing systems, Vallee and Johansen's PLANET and Hiltz and Turoff's EIES. Although six years earlier Vallee and Johansen made reference to the absence of "nonverbal and paralinguistic cues" in computer-mediated communication, Carey's purpose was quite different: to analyze the *presence* and *purpose* of written paralanguage in computer conferencing, much as Hiltz and Turoff had done in 1978. This was the first time that the term paralanguage was applied to specific features in computer-mediated communication and analyzed systematically.

Carey's intent was to "to isolate some of the paralinguistic features which are present in computer mediated communication and to begin to map the patterning of those features" (p. 67). He used Erving Goffman's frame analysis as a theoretical construct: computer conferencing as a "frame of social activity" which took into consideration many factors including the type of communication, who communicated, and the cost of transmission. Carey's concern in frame analysis was "to understand differences in a situation which make a difference":

The computer conferencing frame is characterized by an exchange of print communication between individuals. That is, it may involve person to person or person to group communication. Typically, the exchange is asynchronous with several hours or a few days lapse between sending and receiving.

In all of the transcripts examined for this study, the composer of the messages typed it into the system. Further, the systems were used for many purposes: simple message sending (electronic mail), task related conferencing, and fun (e.g. jokes and conferences on popular topics). Bills for usage were paid by the organizations involved, not the individuals themselves. These elements within the frame may affect the style of interaction. (p. 67)

Within this frame, Carey identified five different categories of paralinguistic features: vocal spellings; lexical surrogates and vocal segregates; spatial arrays; manipulation of grammatical markers, and minus features.³⁶ Each of these categories contained examples from the computer conferencing transcripts and interpretations of their purpose.

In his analysis of the functions of paralanguage in computer-mediated communication, Carey observed the differences in the patterning of the individual features. That "some features mark a short syllabic or polysyllabic segment," "while others mark full sentences or the entire message" (p. 68). He also pointed out that "many of these features have an analogic structure: in some manner, they are like the tone they represent. For example a user may employ more or fewer periods, more or fewer question marks to indicate degrees of pause or degrees of perplexity" (p. 68).

Carey believed that one purpose of paralanguage in computer-mediated communication was to mark a change in the message. He called attention, albeit briefly and in a limited way, to the function of contrast as it related to some paralinguistic features:

Paralinguistic features in computer conferencing occur, often, at points of change in a message: change of pace, change of topic, change of tone. In addition, a message which is typed in all caps does not

³⁶ These are fully explained beginning on p. 116.

communicate greater intensity or stress. Capitalization must occur contrastively over one or two words in an otherwise normal sentence or over one or two sentences in a message which contains some normal capitalization.

Most paralinguistic features can have more than one meaning. Reviewed in isolation, a feature might indicate a relaxed tone, an intimate relation with the receiver, or simply sloppiness in composition. Readers must rely upon the surrounding context (both words and other paralinguistic features) to narrow the range of possible meanings. (p. 68)

Finally, Carey observed that further interpretation of paralinguistic elements within context depends on usage patterns within the same message, the individual composer, and other messages by the general population of users.

In his attempt to identify a paralinguistic code structure from these limited sets of context, Carey borrowed from George Trager (1958) when he called this work "a first approximation" (p. 69).³⁷ He concluded that "while there does not appear to be a unified and identifiable code of paralinguistic features within conferencing systems or among users of the systems, the collective behavior of participants may be creating one" (p. 69).

Carey isolated the experience of the user and the frequency of their participation as important factors in the patterning of paralinguistic features. Like Hiltz and Turoff (1978), he found that "generally, experienced and frequent participants employed more paralinguistic features" but that "idiosyncratic patterns appear to be more important in determining usage" (p. 69). On these observations he noted that "the findings serve more to define questions for subsequent study than to provide answers about the variations" (p. 69).

37. For the influence of the work of George Trager on John Carey, see below, p. 108.

Other factors Carey found which affected the use and patterning of paralinguage in computer-mediated communication were the characteristics of the computer terminal, particularly repeating keys, and various special symbol keys such as the dollar sign and star keys. Finally, he noted the development of patterns over time: "early in their usage, some participants appeared to borrow formats from other media with which they were familiar (e.g. business letters, telegrams, and telephone conversations). Over time, patterns of usage converged somewhat. However, idiosyncratic variation remained strong" (p. 69).

Carey's conclusions about the role and function of paralinguage in computer conferencing directly address the idea of effectiveness in communication: "The presence of paralinguistic features in computer conferencing and the effort by users to communicate more information than can be carried by the words themselves, suggests that people feel it is important to be able to communicate tonal and expressive information" (p. 69).

Thus paralinguage is one way in which people compensate for the narrow bandwidth: the absence of nonverbal and voice cues, and therefore the lack of redundancy of the channel. Communicating with precision, however, is not an easy task: "Users must work in computer conferencing to communicate information about their feelings and state of health which naturally accompanies speech" (p. 69).

Computing in Education and in the University

In the early 1980's, computer-mediated communication in the educational setting became increasingly popular among scholars. Many social scientists found that the educational context and the university setting provided a ready-made

group of respondents for a variety of approaches including instructional, behavioral, and administrative analyses.

The first of these studies by Welsch (1982) examined the use of electronic mail in his undergraduate programming/engineering class of twenty-six students. Electronic mail in this class performed instructional and general communication functions to supplement Welsch's limited time on campus. Electronic mail was used in answering questions, assigning and collecting homework, and charting the students' progress. The time it took for Welsch to comment on assignments and give individual grades was substantially less than what was possible through traditional methods, and approximately three-quarters of the students found electronic mail preferable to in-person meetings and typical paper-based assignments.

"Real Education in Non-Real Time: The Use of Electronic Message Systems for Instruction" (1983), was one of two content analysis studies of group communication by Clark Quinn, Hugh Mehan, James Levin, and Steven Black of the Laboratory of Comparative Human Cognition at the University of California, San Diego. "Real Education in Non-Real Time" explored the educational costs and benefits of electronic messaging systems in the classroom where the application was used as an instructional tool. Their content analysis methodology utilized Mehan's (1979) Initiation, Reply and Evaluation (I-R-E) categories developed for communication in an instructional classroom setting. In their analysis of two different groups within the class, one which used electronic mail and one which did not, they found longer responses to questions in the electronic group than in the face-to-face group, and that the former had more complex answers to questions, but that there were no significant differences in grades between the two groups. In the electronic group, although one-half of the students had previous experience with

computers, the authors found that this did not influence the students' contributions to the electronic discussions in the number of messages sent, the final grades, or the amount of time spent online.

Black, Levin, Mehan and Quinn explored the findings of longer responses to questions in the electronic group through a discourse analysis of the transcripts in "Real and Non-Real Time Interaction: Unraveling Multiple Threads of Discourse" (1983). Again using Mehan's content analysis categories, they analyzed the messages and mapped them according to threads of discourse in face-to-face and computer-mediated communication. This was a more sophisticated version of Vallee and Johansen's earlier topic and interactive thread analysis methodology, and one which reflected advances in discourse analysis scholarship during that decade.

The authors found more multiple threads of discourse, demonstrated by the variety of topics, in the computer-mediated communication than in the face-to-face interaction. They attributed this condition to compensation for the time lag in electronic mail which resulted in individuals increasing the density of information communicated in each message, in part as a time-saving device.

Ronald Rice and Donald Case explored the educational administrative use of electronic messaging systems in "Electronic Message Systems in the University: A Description of Use and Utility" (1983), an extremely valuable study in computer-mediated communication. The system, Stanford University's Terminal for Managers (TFM) program, provided electronic mail for senior University executives and computer center staff as a part of Stanford's mainframe time-sharing systems. User surveys indicated that electronic mail was most appropriate for the exchange of information and asking questions, and least appropriate for resolving disagreements, getting to know someone, and for bargaining/negotiating. Rice and Case found

differences between the two groups in their attitudes about use, however. The experienced computer center personnel were "more favorable toward [the system] as an appropriate medium than were the managers," who were inexperienced. Further, the system "did not seem as impersonal to the experienced computer services personnel as it did to the managers," nor did the latter group exhibit any real changes in their attitudes over time (p. 138).

The broad concept of the "culture of computing" in the university and its impact on novice undergraduates was explored from organizational and social psychological perspectives by Lee Sproull, Sara Kiesler, and David Zubrow in "Encountering an Alien Culture" (1984). Their quantitative-qualitative study explored the initial computing experiences of 268 liberal arts freshman.

While the authors accurately described some of the factors which influence computing for all users, such as problems with the computer system and competition for terminals, they were confused about the differences between a "computer culture" and what is commonly known as the "computer subculture." They were correct in their statement that the computer culture has "values and norms, a language, a status hierarchy, artifacts, membership signs, and boundaries to distinguish members from nonmembers" (p. 33), yet their definition for most of these aspects was drawn only from one perspective. Specifically, they defined the values, norms, language and other features of the computing culture from the elitist experiences of "hackers." A term they never clearly defined, except by default, hackers are experienced, technically expert, dedicated and often fanatic computerists. At least to these authors, hackers represented the entire "culture of computing." Only at the end of their analysis did they allude to, but did not explain, the characteristics of the "subcultures of computing" (p. 47), where the hackers should rightfully be placed.

Within these limited boundaries, the authors found that the "individualistic and idiosyncratic" computer culture on a college campus was characterized by adolescent pranks and tricks, impoliteness and irreverence, and mild larceny such as faking accounts and stealing computer time, and that these practices are tolerated, if not encouraged.

To those students outside of this culture, computing takes on an "alien nature" (p. 33), and is not just something new. This is particularly true for first-time or novice user who competes for terminals, system time and a variety of computing resources with other students doing assignments and research, hackers, faculty, and university administrators:

In order for a novice actually to use a computer system, he or she must negotiate a host of arbitrary conventions that are unrelated to the science or theory of computing. New students are thrown into a sea of unfamiliar syntax, I/O devices, priority classes, programs and system quirks with no conceptual life vest to keep them afloat. These problems are compounded because computing is a scarce resource on every college campus; thus students can be forced to wait for long periods of time just to gain access to the potentially frustrating machine. (p. 131)

Sproull, Kiesler and Zubrow correctly point out that "the strangeness of these experiences is exacerbated by the fact that they occur in a social context with which other people are quite comfortable" (p. 131), and as well occur outside of the sheltered and familiar instructional environments afforded by the classroom.

The process of novices encountering the computer culture, according to the authors, becomes "reality shock": an experience composed of changes, contrasts and surprises. "Reality shock is important because it signals that prior instrumental behaviors are no longer appropriate and new ones must be learned. It is also important because it colors the early lessons learned in the new culture" (p. 34).

When reality shock becomes a factor in the experiences of novice computer users, it leads to feeling overwhelmed, and to questions about self-identity and self image.

The authors have presented a picture of college and university computing which is not entirely correct. But even if their broad definition of the culture of computing is derived from an elitist or atypical set of experiences, the organizational and technical realities often exist as they have described them. Particularly, that because of the organizational and technical nature of computing in a university setting that the experience of novice or first-time users is an unfamiliar one, not easily compared to other adult experiences; that computer systems require a technical knowledge that the novice never has; that computing resources are scarce and often dictate when and where a user can do their work, and that this change in the social context brings the student, in varying degrees, into the culture of computing as it exists at the university.

Theory

Much of the research in computer-mediated communication is reflected in the new theoretical constructs about interpersonal communication developed by Robert Cathcart and Gary Gumpert in "Mediated Interpersonal Communication: Toward a New Typology" (1983, 1986). Their idea of "mediated interpersonal communication" is based on the understanding that communication channels are not neutral, and that there are many different kinds of channels which affect interpersonal relations.

Mediated interpersonal communication is a "general category referring to any situation where a technological medium is introduced into a face to face situation" (p. 30). Mediated interpersonal communication has several subcategories:

- interpersonal mediated communication: telephone conversations, letters, CB radio, electronic mail, audio and video cassettes
- media simulated interpersonal communication: para-social interactions, broadcast-teleparticipation
- person-computer interpersonal communication: computers utilized as interpersonal proxies
- unicomunication: the utilization of such artifacts as tee shirts and bumper stickers

Interpersonal communication channels include mass communication messages because "television, radio, and film provide feedback which reinforce, negate, and/or verify an individual's self-image" (p. 28). In the same light they observe that "letter writing and telephoning has altered face-to-face relationships" as communicants do not have to leave their home," and as a result, "face-to-face contact with the people in the street . . . can be avoided. The eyes, nose and tongue can be protected from unwanted stimuli and physical contact is limited" (p. 30).

Computer-mediated communication was included within this typology under the category of interpersonal mediated communication. This category refers to any person-to-person interaction where a medium has been interposed to transcend the limitations of time and space, such as with electronic mail. The interposed medium is not neutral, but determines the quantity and quality of information and shapes the relationships of the participants.

The characteristics of the medium which affect the process and outcome of communication include writing, time, and permanence. Thus the authors conclude that "interpersonal written communication differs from face-to-face communication because it requires a mastery of a secondary coding system--written language--and a knowledge of the conventions of that medium" (p. 30). Further, the time factor involved in delayed communication also alters the relationship between the communicants, and "the fact that written communication can be stored and

retrieved makes the exchange context-free and permanent. Consequently, there are things that can be said face-to-face that could never be put into writing" (p. 30).

In "Theories Old and New: The Study of the New Media" (1984), Ronald Rice and Frederick Williams pursue some of these ideas in a broader context of interpersonal communication which includes the "personal qualities of the new media." Fundamentally, they view the new communications media--such as computers, videotex and teletext, and interactive cable--much like previous media, in that they are basically extensions of human senses and effectors: "some of the distinctions between new media and traditional media are not discontinuous as are the distinctions between traditional media and natural media such as hearing, seeing and speaking" (p. 56). Furthermore, the interactivity of the new media and therefore its use in a variety of interpersonal situations breaks down "the discrete distinction between interpersonal communication and mass-mediated communication . . . giving way to a continuum of communications behaviors" (p. 56).

Rice and Williams base part of this analysis on the idea of Social Presence developed by the Communications Studies Group in 1976. While they admit that Social Presence "is at best a vague concept" applied only in lab settings and for simulated tasks (p. 61), they believe it is a theory worth applying to the new media: "Chief among the reasons given for the differentiation among media in Social Presence are the stimulus-conveying restrictions of some media compared with others. The most salient restrictions are those related to the conveyance of *nonverbal* aspects of communication" (p. 58).

The authors measured the appropriateness of a medium by three factors which affect its Social Presence. First, that the amount and type of channel redundancy may affect the appropriateness and effectiveness of a medium. That "highly

interpersonal relationships entail certain kinds of uncertainty that can be reduced only by sufficient amounts of redundancy provided by nonverbal information . . . or simply more redundancy with a single channel" (p. 59). The second factor is the "potential for interactivity"—immediate two-way exchanges—in which "feedback facilitates an ongoing regulation and cueing of a communication interaction" (pps. 59–60). And finally, the privacy—versus—public quality of the medium, and how it relates to "the individual's consciousness of whether 'outside' individuals may be able to monitor an exchange. The less privacy, the less potential for communication to become personalized and hence, the lower social presence" (p. 60).

Communication, Behavior and the Medium

In 1984 and 1985, Carnegie–Mellon University researchers published two articles which explored the presence of uninhibited and emotional behavior in personal and group delayed and interactive communication. Controlled experiments served as the basis for "Social Psychological Aspects of Computer–Mediated Communication" (1984) by Sara Kiesler, Jane Siegel, and Timothy McGuire, and "Affect in Computer–Mediated Communication: An Experiment in Synchronous Terminal–to–Terminal Discussion" (1985) by Kiesler, David Zubrow, Anne Marie Moses and Valerie Geller. Both of these articles were a part of the comprehensive work of the Committee on Social Science Research in Computing at Carnegie–Mellon and represent the social psychological approach in computer–mediated communication studies.

In the "Social and Psychological Aspects of Computer–Mediated Communication" (1984), the authors outlined six important areas. Their most important questions and observations concerned the idea of the regulation of

communication as it corresponded to the absence of nonverbal communication and tone of voice. They saw the result as uninhibited or emotional behavior which related directly to the depersonalization of the medium and further, to the lack of norms within the computing culture's main form of communication:

- Time and Information Processing Pressures. "Does easy, rapid communication . . . change the quantity or the distribution or the timing of information exchanged?" (p. 1125)
- Absence of Regulating Feedback. "Does communication through text alone reduce coordination of communication?" (p. 1125) The absence of head nods, smiles, eye contact, and tone of voice to regulate, modify and control exchanges may make electronic communication inefficient.
- Dramaturgical Weakness. "Computer communication might weaken social influence by the absence of such nonverbal behavior as . . . speaking loudly, staring, touching and gesturing." (p. 1125)
- Few Status and Position Cues. "Software for electronic communication is blind with respect to the vertical hierarchy in social relationships and organizations." (p. 1125) The loss of cues for status, power and prestige in electronic communication may lead to equal participation by all members.
- Social Anonymity. Electronic communication may be impersonal or depersonalizing "because it uses printed text, without even the texture of paper to lend it individuality Communicators must imagine their audience, for at a terminal it almost seems as though the computer itself is the audience. Messages are depersonalized, inviting stronger or more uninhibited text and more assertiveness in return." (p. 1125)
- Computing Norms and Immature Etiquette. "Because electronic communication was developed and has been used by a distinctive subculture of computing professionals, its norms are infused with that culture's special language . . . and its explicit rejection of organizational conventionality and 8-hour workdays" (p. 1126). People using electronic mail overstep conventional time boundaries dividing office and home; they mix work and personal communication; they use language appropriate for boardrooms and ballfields interchangeably; and they disregard normal conventions of privacy . . . (by posting personal messages on general bulletin boards). This behavior is not counteracted by established conventions or etiquette for computer communication. There are few shared standards for salutation, for structuring formal versus informal messages, or for adapting content to achieve both impact and politeness." (p. 1126)

From this list of questions and observations the authors identified two characteristics of computer-mediated communication: "a) a paucity of social context information and b) few widely shared norms governing its use. These characteristics may affect communication via the computer in at least three areas. First, the lack of

social feedback and unpredictable style of messages might make it difficult to coordinate and comprehend messages Second, social influence among communicators might be more equal because so much hierarchical dominance and power information is hidden. Third, a social standard will be less important and communication will be more impersonal and more free because of the rapid exchange of text, the lack of social feedback, and the absence of norms governing the social interaction redirect attention away from others and toward the message itself" (p. 1126).

The authors concluded that "computer-mediated communication seems to comprise some of the same conditions that are important for deindividuation--anonymity, reduced self-regulation, and reduced self-awareness" because of the absence of norms, social standards and inferences about individuals that are possible in traditional communication (p. 1126). More specifically, that "electronic media do not efficiently communicate nuances of meaning and frame of mind, organizational loyalties, symbolic procedural variations, and especially, individuating details about people that might be embodied in their dress, location, demeanor, and expressiveness" (p. 1126).

The controlled experiments used in the "Social Psychological Aspects of Computer-Mediated Communication" were based on interactive and delayed applications applied to three-person groups who were asked to reach a consensus on a choice-dilemma problem in three different contexts: face-to-face, anonymous computer use, and nonanonymous computer use. The main dependent variables in all of the experiments were communication efficiency, participation, interpersonal behavior, and group choice.

The results of these experiments indicated that the computer group took longer to reach consensus than did the face-to-face groups, much as Hiltz (1978) had found in an earlier study of group decision making. In the areas of participation, group choice, and interpersonal behavior, the authors found that the "people in computer-mediated groups were more uninhibited than they were in face-to-face groups, as measured by uninhibited verbal behavior, defined as frequency of remarks containing swearing, insults, name calling, and hostile comments" (p. 1129). These conclusions were also similar to Hiltz's observations about "tendencies toward overt sociability" and a "letting down" of a public image (1978) and can also be extrapolated from Carey's study of paralanguage (1980). Uninhibited behavior in these experiments was found to be somewhat higher in the interactive conference than in the delayed electronic mail communication. Kiesler, Siegel and McGuire attributed these differences between face-to-face and computer interaction to the "difficulties of coordination from lack of informational feedback, the absence of social influence cues for controlling discussion, and a depersonalization from lack of nonverbal involvement and absence of norms" (p. 1130).

Taking into account experience as a determining factor, the authors concluded that since they varied their sample among experienced and non-experienced computer and network users that their findings "were generalizable to adults and nonstudents as well as to undergraduate students" and that their results "apply not just to novices but also to people who use computers often and for whom electronic mail and message systems as well as simultaneous discussion systems are familiar" (p. 1129). In partial support of this conclusion, they cite "observers of computer networks [who] have noticed uninhibited behavior for years. In the computing subculture, the word *flaming* refers to the practice of expressing oneself more strongly on the computer than one would in other communication settings" (p.

1130).³⁸ These conclusions about computer experience were opposite from those of Hiltz and Turoff (1978), who found differences between the communications patterns of novice and experienced users, Carey's (1980) similar interpretations of paralinguistic usage by experience, and Rice and Case's (1983) findings that experienced users felt the medium more appropriate for certain kinds of communication than did novices.

Kiesler, David Zubrow, Anne Marie Moses and Valerie Geller pursued many of these themes and observations in their later article, "Affect in Computer-Mediated Communication: An Experiment in Synchronous Terminal-to-Terminal Discussion" (1985). Their stated purpose was to analyze the influence of interactive communication on physiological arousal, feelings, and expressive behavior, or, *affect*.

These experiments, the results of which were based largely on a quantitative content analysis of the transcript, were "a comparison of physiological arousal, subjective self-reports of feelings, attributions, and evaluations; and interpersonal behavior in two communication settings, one in which two people met and talked with each other for the first time face-to-face, and the other in which two people met and talked with each other for the first time via an online computer conversation" (p. 84). The subjects were eighty male and female undergraduates from Carnegie-Mellon University, divided into same-sex and mixed-sex pairs, who were given topics to talk about with their partners.

Physiological response measured by pulse and palmar sweat indicated no "statistical support for the hypothesis that computer-mediated communication alters physiological arousal" (p. 92). The social psychological aspects of this research

38. See the message on p. 36 for an example of a flame.

however, were more conclusive in measuring expressive behavior evidenced by uninhibited remarks, self-disclosure and depersonalization. Face-to-face meetings were tape recorded, and the transcripts of the online discussions content analyzed. "Remarks rather than words" were the unit of analysis, defined as "as a single thought or message contained in a word, phrase or sentence(s). [The] total number of remarks were counted and frequencies of particular kinds of remarks were expressed as percentages of the total for each pair" (p. 89).

These remarks were interpreted to indicate that "one measure of expressive behavior was uninhibited social behavior." The transcript was coded for remarks which contained (1) impolite statements (2) swearing (3) flirting (4) exclamations (5) expressions of personal feelings toward the other, and (6) the use of superlatives in expressing evaluations. A second measure of expressive behavior was self-disclosure, or remarks which revealed intimate and personal information about the speaker. These were rated on 3-point scales, low, medium, and high-intimacy disclosure (p. 89).

The authors' concluded that "the relative proportion of remarks coded as uninhibited behavior in the computer-mediated condition was significantly higher than it was in the face-to-face condition, 4.6% versus 2.0%. Specifically, a higher proportion of total remarks in the computer-mediated-communication condition than in the face-to-face condition were impolite, swearing, explicit statements of high-positive regard, outbursts, and used superlatives" (p. 94). This data also supported their earlier findings (1984) that uninhibited behavior will occur more frequently in computer-mediated communication than in face-to-face communication because of the depersonalizing characteristics of the situation: the absence of nonverbal and spoken communication, confusing the computer with the

real audience for the message, and the lack of norms. Their analysis also supported the idea that computer-mediated communication was more depersonalizing than face-to-face communication as evidenced by the "higher proportion of formal expressions" and the "smaller ratio of spontaneous questions to directed questions" (p. 96).

Additional support for these conclusions can be seen in "Reducing Social Context Cues: The Case of Electronic Mail" (Sproull and Kiesler, 1987). In their study of very experienced corporate electronic mail users for whom electronic mail was a routine activity, Kiesler and Sproull measured uninhibited behavior according to the amount of flaming and hypothetical tasks concerning good or bad news. The respondents reported seeing flaming in their messages almost ten times more often than they recognized the phenomenon in face-to-face communication.³⁹

As another measure of the sender losing sight of their audience and focusing strongly on themselves, Kiesler and Sproull hypothesized that "people dispense with direct acknowledgements of the other person, that is, salutations" (p. 12). They also believed that people are "more likely to use a closing (that is, the author's name) than a salutation (other's name)." Thus "the total number of words in both salutations and closings is an indicator of the total attention paid by the sender to the social relationship" (p. 12). Furthermore, they believed that "the number of words in the closing compared to the number in the salutation is an indicator of the relative focus on the self" (p. 12). Their quantitative analysis of the messages

39. "Flaming" according to Kiesler and Sproull in note 7 of this article is "a term coined by the hacker community." This claim is dubious in light of the fact that *flame* is referenced in the Oxford English Dictionary as early as 1548 precisely to its current use in computing: to burn (with envy, fury, indignation); to look angrily or passionately upon; to *flame out*, up: to break out with anger or indignation, to 'fire up'. Usage of *flame* continued in this manner from the 16th century up to the present.

"proved" their hypothesis of self-absorption: the mean number of words in salutations was .31, and the mean number of words in closings was .94.⁴⁰

Finally, in support of their idea of uninhibited behavior (but at variance with their earlier conclusions about formality), Kiesler and Sproull concluded, from the large number of non-work messages which were sent that electronic mail is a "technology that makes it easy to be sociable" (p. 21).

The contributions of Sara Kiesler, Lee Sproull, and the other Carnegie-Mellon researchers comprise an important body of work in computer-mediated communication studies. While they have and continue to do much to open areas of inquiry through innovative methodologies, there are some critical problems with their work which should be noted.

One of the most apparent problems is their generalization from one type of computer-mediated communication to many others, and to the process as a whole: they often apply results of experiments conducted in interactive communication, i.e., interactive talk, to delayed communication, i.e., electronic mail, bulletin boards, and computer conferencing, even though the individual characteristics of these modes make them quite different. Another problem is the wide applicability of their findings. Their observations about the similarities in the communication patterns of experienced and non-experienced computer users are far from definitive because of their small samples, the lack of precision in the presentation of results, and their failure to note the results of earlier studies, particularly those of Hiltz, Turoff, Carey

40. It is unclear why Kiesler and Sproull only defined closings as the author's name, thereby excluding formal closings, e.g., "sincerely yours," or the less formal and more popular pre-closings such as "have a nice day." If closings are the author's name, then it can only be that the mean number of words in a closing is an accident of birth. Finally, it is not apparent why they believe that the use of salutations and closings, and especially the latter, indicates *only* a focus on self and perhaps not an increased sense of audience awareness as well.

and Rice and Case, all of whom explored differences in communication based on user experience and technical expertise. In addition, it would also appear that much of what Kiesler and Sproull found in the area of the communication efficiency of groups was presented in earlier studies by Hiltz, yet this research was not acknowledged.

One extremely important inconsistency in their findings becomes obvious when the total sum of their research is examined. First they conclude that computer-mediated communication is *impersonal*, or more impersonal than face-to-face interaction, with little attention paid to relationships, because it encourages *uninhibited* or more *expressive communication* due to the lack of nonverbal, spoken and contextual cues, the absence of clear-cut norms, and as one result the substitution of the computer as the audience. Second, they reveal that subjective and other measures indicate that computer discussions are *impersonal* because they are *more formal* and *lacked spontaneity*, unlike face-to-face discussions. Thus their findings would appear to be contradictory: they define *impersonal* communication as both *uninhibited and expressive as well as formal and unspontaneous*. They attribute the same condition, i.e., depersonalization or impersonalness, to opposite characteristics. Uninhibited and expressive behavior is not formal and it does not lack spontaneity. Conversely, formal and unspontaneous behavior is not uninhibited, nor is it particularly expressive. Finally, they fail to explain how all of these characteristics could occur at the same time in a communication.

Ronald Rice and Gale Love avoided these inconsistencies in "Electronic Emotion: Socio-Emotional Content in a Computer-Mediated Communication Network" (1985, 1987), an analysis of public group communication content and structure. This research addressed earlier contradictory findings about the degree of emotionality in computer-mediated communication. Particularly, that Short,

Williams and Christie, among others, found that the "narrowness of channel and lack of verbal cues . . . lead to a decreased 'social presence'" (p. 4), but Hiltz documented "a good deal of honest expression in CMC messages" (p. 5). They also took into consideration the experience of the user and the nature of the task as determinants of emotional content.

Their primary evidence was six weeks of transcripts from the computer bulletin board of a nationwide public computer conferencing system, Medsig/Compuserve. The sample of 112 people, primarily physicians, but also students and nurses, sent or received 388 messages during this period. Rice and Love utilized two methodologies in order to determine the amount of socio-emotional content in these messages: a quantitative content analysis using Bales' (1950) categories to determine the content of the communication, and a network analysis to determine "the patterning or structure of a specific type of relation linking a defined set of nodes" (p. 12). Socio-emotional content was defined as "interactions that show solidarity, tension relief, agreement, antagonism, tension and disagreement." Task-dimensional content was defined as "interaction that ask for or give information or opinion" (p. 7).

The results of the content and network analyses showed that there is no one hypothesis about socio-emotional content in computer-mediated communication. Instead, they found that "there is a slight but significant tendency for more active users to send more SE content . . . [but] while CMC allows more communicative users also to be more socio-emotional, users do not become more so over time (p. 17). In addition, they found a high percentage of messages, nearly 30%, with socio-emotional content, which "is generous in light of the suggestions that CMC systems are low in 'social presence' or could be seen as 'information poor' media, especially

considering the professional orientation of the conference members" who did not know each other (p. 16).

They did find evidence to support the idea that "continuing users tend slightly to develop patterns of usage--both in amount and content--that are similar to other continuing users" (p. 18). Rice and Love concluded that "the wider implication . . . is that CMC systems can support social communication and the communication reflects the inherent communication traits of the users, but that this may not be the appropriate focus if over-emphasized or if others on the system see the network research community oriented to exchanging task-oriented information" (p. 18).

Michael Spitzer explored the idea of the differences in writing styles in computer conferencing and traditional printed forms in "Writing Style in Computer Conferences" (1986). By "writing styles" Spitzer meant the features users have created to achieve effective communication in this new media. Although he identified these features as "typographical devices" or "graphic characters," Spitzer actually had analyzed the use of paralanguage in computer conferencing. Both his vocabulary and interpretation of the purpose of these features was far different from Carey's (1980) as well as all other researchers who have explored this area. His analyses of the function of certain paralinguistic features, albeit superficial, was within the mainstream of scholarship, however.

The participants in this computer conference were sixty college English professors conferring on the ways to use computers to teach writing. The conferencing system, Participate, a commercially-available application on the SOURCE, was accessed via Telenet. All of the contributions were unedited text.

Spitzer's explanation of "writing style" included the observations that people "need not be poets to convey emotion and meaning through language" and that "an advantage of computer conferencing is that it forces users to practice writing, and this practice will improve their literacy and writing skill. Those who write clearly are rewarded with responses, so good writing is reinforced. Those who don't write clearly are often ignored. Gradually, users can become adept at using the language" (p. 21).

He interpreted the purpose of special devices [paralanguage] as a communications "crutch" for those who do not write well and therefore who could not make themselves completely understood through prose: "the keyboard is a tool that can be used to advantage by those who choose not to rely entirely on their writing proficiency." Thus what Spitzer described as "typographical devices or gimmicks" (p. 21), including the use of capital letters to stress an idea, surrounding words with asterisks, or using blank space, were devices for those who did not write well enough to express full emotion or precise meaning outside of language.

Spitzer's examples of "graphical characters," taken from the computer conferencing transcripts, are interesting, although not demonstrably more elaborate or informative than Carey's (1980) examples. He offered no systematic analysis of the use of these characters or devices, nor did he group them into categories, as did Carey.

It is interesting to note that Spitzer's analysis placed the entire burden of communication on the writer/communicant, and did not consider the characteristics of the medium. His contention that good writing leads to effective if not complete communication ignored Kiesler and Sproull's analyses of the characteristics of the

medium, especially the absence of nonverbal and spoken cues as components of communication.

Spitzer did, however, make two points worth noting. First, that overuse of any of these devices would render them ineffective. And second, that the increasing practice of editing text rather than sending messages "as is," or similarly, creating a message on a microcomputer rather than typing directly online, has implications "about the degree of sincerity that is implicit in the apparent spontaneity of the messages we read" (p. 22). Thus paralanguage in computer-mediated systems will be employed differently by those who edit messages and those who do not, and this will impact on communication.

Spitzer's ideas about editing a message, its implications about the sender and the lack of spontaneity were first posited, although somewhat differently, by Vallee and Johansen in 1974. Researchers are reminded again that this fluid form of written communication may not always appear as it was originally conceived by the writer, and that there may be no such thing as a rough draft. This at least for the moment brings full circle one important aspect of the evolutionary development of computer-mediated communication scholarship.

Summary

Some properties of human communication via computer have been clearly identified and intelligently interpreted. What pervades this field at the moment, however, is conflict.

The computer seems to be an impersonal communications medium, encouraging in some users a formality not found in other forms. Yet for others, the computer is

a personal medium which promotes uninhibited behavior and a letting down of a public image. The written form of the communication would appear to be the main determinant of these opposite conditions. Because of the absence of nonverbal and paralinguistic cues writing either promotes more formal communication than would occur in a face-to-face situation, or, because written communication is delayed and once removed it encourages less formal and uninhibited communication. Thus the lack of nonverbal and paralinguistic cues has been interpreted as contributing to both of these opposite conditions. In addition, some scholars believe that computing experience has little impact on communications effectiveness, while others see experience and a resulting shared communications code as one important means by which users compensate for the narrow bandwidth and lack of channel redundancy. Methodologically, some scholars avoid generalizations and comparisons across group types and media, while others encourage these research designs.

What concerned Vallee, Johansen, Hiltz and Turoff in the 1970's still is very much in the forefront of communications research: what are the characteristics of human communication via computer. There is no precise list at the present time, and if there were, it is highly unlikely that scholars would agree on its contents. At the moment, there are a host of conflicting conclusions in an extremely factionalized field. If the evolutionary course of scholarship holds true here, a synthesis of computer-mediated communication is at hand, perhaps within the next few years, and undoubtedly more than one. Consensus, however, does not appear likely until the turn of the century.

Chapter V

Paralanguage: Electronic, Written and Spoken

The Basis for an Analytical Framework

As Vallee and Johansen observed in 1974, "each medium has *its own inherent characteristics*." With this in mind, an analytical framework for the interpretation of paralanguage in electronic mail should be based as much as possible on the primary form of communication and the medium in which it occurs, in this case, writing on the computer. The first component of this analytical framework then is the use of the term *electronic paralanguage* to describe the phenomenon in computer-mediated communication.⁴¹

In interpersonal communication there are two forms of paralanguage which preceded the phenomenon in computer-mediated communication: spoken and written paralanguage. Taken together, these three forms have many of the same functions and share certain terms for description and interpretation. This is particularly true for written and electronic paralanguage, since they are both based on a system of symbolic representation "which has an existence distinct from that of spoken language" (Baron, 1981). For the purposes of this research, the initial and direct technical and theoretical influences on electronic paralanguage can be seen more clearly from written language rather than from spoken language.

41. The term *electronic paralanguage* refers only to paralanguage found in computer-mediated communication systems including electronic mail, bulletin board computer conferencing. Hereafter in this chapter the term *written paralanguage* refers to paper-based writing, and the term *spoken paralanguage* refers to face-to-face communication.

Yet since both spoken and written communication are different from electronic communication, paralanguage cannot occupy identical positions in all three forms: all three are coded differently, that is, the "set of unambiguous rules, whereby messages are converted from one representation to another" are different for each (Cherry, 1982). Borrowing definitions, terminology, functions and characteristics from spoken and written paralanguage is helpful and accurate only to a point: the point where the spoken or written contexts becomes the electronic context as well, and therefore the unique or specific properties and functions of electronic paralanguage may be obscured.

While it is clear that much is shared among these forms, it is also clear that there is much which is different. As a result, a reasonable context for interpretation of electronic paralanguage should be built on both similarities and differences. The analytical framework (designed for the interpretation of electronic paralanguage) presented here makes relevant comparisons to both spoken and written paralanguage. Indeed, it is in part constructed from general works and theories of these two other forms. But this framework also assembles information about paralanguage in computer-mediated communication based on difference detection.⁴² The analytical framework for this research, then, provides a broad context for interpretation: it maintains the medium and form of communication as the primary base for analysis, and subsequent comparisons take into account the similarities and differences in relation to other forms.

42. For the advantages of detecting differences rather than finding similarities, see Hugh Kenner, "Libraries and Glowlamps: A Strategy of Reassurance" *Scholarly Publishing*, Vol. 18, No. 1, October, 1986, pp. 17-22.

Spoken Paralanguage

As used by linguists, the term language applies to speech or spoken words. Language as defined by Edward Sapir "is a purely human and non-instinctive method of communicating ideas, emotions and desires by means of a system of voluntarily produced symbols. These symbols are, in the first instance, auditory and they are produced by the so-called 'organs of speech'" (1921, p. 8). For linguists, writing is "a way of recording language by means of visible marks" (Bloomfield, 1933, p. 21), or a secondary symbol system for language, which is spoken (Baron, 1981; Basso, 1974).

The term paralanguage, used to identify and describe certain aspects of speech, became a part of linguistics through the work of George L. Trager, although the idea originated with Sapir (1921). Trager defined paralanguage in his 1958 article "Paralanguage: A First Approximation," which appeared in *Studies in Linguistics*:⁴³

When language is used it takes place in the setting of an act of speech. Speech ('talking') results from activities which create a background of voice set. This background involves the idiosyncratic, including the specific physiology of the speakers and the total physical setting; it is in an area of prelinguistics (Trager, 1949, 2-3.) Against this background there take place three kinds of events employing the vocal apparatus: language (as described): variegated other noises, not having the structure of language--vocalizations; and modification of all the language and other noises. These modification are the voice qualities. The vocalizations and voice qualities together are being called paralanguage (a term suggested by A. A. Hill, who has been interested in the development of these studies). Paralanguage is part of the metalinguistic area of activity (pp. 3-4).

In this first approximation, Trager offered ambitious definitions for the two main components of paralanguage, voice qualities and vocalizations. Voice qualities

43. The origins and development of the study of spoken paralanguage do not relate directly to this research and therefore will not be explained here. For background see Crystal (1969), pp. 44-55) and Carey (1976, pp. 14-27).

"are recognizable as actual speech events, phenomena that can be sorted out from what is said and heard" (pp. 4-5). These include pitch range; vocal lip control; glottis control; articulation control; rhythm control, resonance and tempo (p.5). Vocalizations, "by contrast with voice set and voice qualities, which are overall or background characteristics of the voice . . . are [the] actual specifically identifiable noises (sounds) or aspects of noises" (p. 5).

Among the three kinds of vocalizations Trager defined are *vocal characterizers*, *vocal qualifiers* and *vocal segregates*. Vocal characterizers include, in different extremes, laughing and crying; giggling; snickering; whimpering; sobbing; yelling and whispering, and moaning and groaning (pp. 5-6). Vocal qualifiers, or the characteristics of intensity, pitch height and extent, each have a range up and down, and three degrees of measurement (p. 6). Vocal segregates are noises, such as *uh-huh* (negation) and *uh-huh* (affirmation), which seem "in many ways to be identical with actual language sounds" but do not "appear in the kinds of sequences that can be called words. . . ." Vocal segregates are also analyzed by the physical "manners of articulation" (pp. 6-7).

The Study of Spoken Paralanguage

The position of paralanguage in linguistics began to change almost as soon as Trager defined it, and its role still is unclear. According to Crystal, the term "paralanguage" filled a slot in Trager's overall descriptive framework [of linguistic theory] and once [his] parent-theory came to be considered inadequate as a view of language, [in the 1960's] then necessarily paralanguage's status became unclear" (1975, p. 50). Many linguists believe that paralanguage is "of marginal significance to linguistics" and more within the realm of "other disciplines" (p. 49). Some have

sought to redefine Trager's paralinguistic features under the heading of prosodic features or prosodic system (p. 94), and as phenomena which exist as a part of language, not outside of it. (pp. 49, 60). Many of the finer points of this debate turn on the physiological aspects of language as a sound system (Crystal, 1969, 1975). Still other scholars, particularly John Carey (1980), perhaps as a result of this ongoing methodological muddle, broadly interpret and use the term paralanguage to include the more recent idea of prosody along with Trager's original definition.

The Functions of Spoken Paralanguage

Paralanguage gives to what is being communicated a character over and above that which is necessary to convey the literal meaning: it presents a meaning outside of a linguistic or grammatical sense, one which usually is more emphatic and often more expressive and emotional. Paralinguistic features such as stress, loudness, pitch, pause and intonation, for example, can augment and enhance language by giving extra meaning to the literal message. As Gregory Bateson observed, "No amount of telling somebody in mere words that one is or is not angry, is the same as what one might tell them by gesture or tone of voice" (1972a, p. 12).

Spoken paralanguage does not have to be at the high or low extreme to be more emphatic or expressive than language. It is not exclusively yelling or whispering, moaning or groaning. More subtle changes in pitch, tone, or stress which reside just outside of linguistic parameters can make speech more emphatic or expressive without reaching dramatic volume or tonal extremes.

Paralanguage often is a redundant property of spoken language. "Redundancy is the property of languages, codes, and sign systems. . ." which when added to communication "guard against misinterpretation" (Cherry, 1982, p. 33).

Redundancy "may be regarded at two levels, the syntactic and the semantic: syntactic redundancy implies additions to a text; something more is said or written than is strictly necessary to convey the message." Semantic redundancy, or the conveyance of meaning, "calls for extra signs; that is, for syntactic redundancy" (Cherry, 1982, pp. 118, 120).

Paralanguage also functions apart from language. Trager considered paralanguage critical to "an act of speech," but Colin Cherry (1982) and Gregory Bateson (1972b) took that belief much further in their assumption that paralanguage, language and nonverbal communication are all crucial to the communicative act. Paralanguage can convey meanings which are very different from those of language and gesture, or, which are altogether absent from those systems. In some situations paralanguage in the form of a pause, grunt, groan or shriek can be the complete communication in and of itself. And as Bateson demonstrated, at certain times it is much more understandable than actual language:

How does it happen that the paralinguistics and kinesics of men from strange cultures and even the paralinguistics of other terrestrial mammals, are at least partly intelligible to us, whereas the verbal languages of men from strange cultures seem to be totally opaque (1972b, p. 372).

An Analytical Framework for Interpretation

Written and Electronic Paralanguage

Written and electronic paralanguage can be interpreted by examining:

- the kind of medium (paper or electronic),
- the recording technique (print, typescript, chirographic, keyed—electronic), and
- the type of writing (public or private)

Written and electronic paralanguage also share several important characteristics which provide the means for more comprehensive and detailed analyses. These characteristics are that:

- paralanguage is a part of a communications system which is delayed and recorded;
- it is visible;
- occurrences of paralinguistic features can be easily identified;
- when recorded on paper paralanguage is permanent and easily retrieved, and
- when recorded on electronic media paralanguage can either be permanent or temporary and retrieval aspects vary widely.

Medium and Recording Technique

Paper—based writing is represented by a variety of recording techniques including print, typescript and handwriting, while writing in computer—mediated communication systems is represented on a terminal screen solely by keyed—electronic text or text entered using a typewriter—like computer keyboard. While any combination of medium and recording technique—whether manual, mechanical, or computerized—can make any word by stringing together the correct letters, *not*

*every device and technique can represent every paralinguistic feature or symbol.*⁴⁴

The medium and recording technique together determine whether many paralinguistic features can actually exist. Therefore for written and electronic paralanguage more than language, the medium and recording technique play critical roles in determining functions and patterns of use: how people use what is available and how they compensate for what they do not have.

Type of Writing

The medium and recording technique are closely related to the type of writing attempted. Types of writing are broadly categorized into public or published writing and private or personal writing. Although we can analyze these three factors separately, ultimately we find that the technical and theoretical aspects of the type of writing are often completely dependent on the medium and technique. The technical capabilities of printing offer the professional or public writer one range of paralinguistic representation, while the technical capabilities of handwriting offer the personal writer another range of representation. Both of these differ from what is available to those who use a typewriter or a computer terminal, although similarities can be found in all. In addition, one of the most important theoretical factors in the type of writing as it relates to paralinguistic features is the audience: whether one is writing for publication or writing only for another person. Particularly within personal communication, who that other person is, i.e., superior, subordinate, or peer, also determines the use of paralinguistic features, just as it determines the actual language.

44. As demonstrated here by the use of italics rather than underscoring.

Written Paralanguage

Medium and Recording Technique

In practically all forms of written communication between people, whether mass-mediated or private, paper serves as the medium of the communication. With the exception of graffiti artists, practically all who write do use paper, whether newsprint, letterhead bond, or loose-leaf. The recording or writing techniques available to those who use paper, either typeset print or laser print, typescript or handwriting, determine the types of paralinguistic features which can be created.

Typeface changes such as boldface and italics, font changes, as well as point size variations—all of which may be used to indicate varieties of paralinguistic stress—are available to those whose writing is made with some kind of printed, typeset or computer-based laser form, and to a lesser extent, with a typewriter.⁴⁵ These features are not available to those who write by hand, who would use as substitutes uppercase and underscoring⁴⁶ because of their inability to create boldface and italics (Lakoff, 1984; Chafe, 1986). Those who write by hand may also use color and size more liberally than those whose writing is represented in print. Multifunction paralinguistic features such as question marks, ellipses and exclamation points are available to all writers, and may be prevalent among those who use a typewriter with repeating keys or those who write by hand. Some paralinguistic features, such as lexical surrogates (word substitutes) and vocal segregates (sound

45. There are several examples of text manipulation in printed published writing. Among the more interesting are E. E. Cummings' exclusive use of lowercase alphabetic characters in his poetry, and Marshall McLuhan's *The Gutenberg Galaxy* (1962) in which he used different point sizes and typefaces within the body of the text.

46. These are cross-over features, or those available to and used by writers with access to more sophisticated typefaces.

substitutes) are independent of medium and recording technique. They are available in all, but are more prominent in some than in others.

Type of Writing

Published fiction and nonfiction, newspaper reporting and personal writing such as letters and diaries, all use paralinguistic features for the same purposes. Clearly, however, both the language and the paralanguage changes according to whether the writing is public or private, and this is directly related to the recording technique available.

More specific aspects of public and private writing can also be seen depending on the audience for each type of communication. The use of paralanguage in a community newsletter or small town newspaper can be completely different from a large circulation tabloid, both for news reporting and feature writing, although all of these publications may share the same printing capabilities. Similarly, the paralanguage used in a personal letter to a close friend will in some cases be different from that found in a business memorandum, even though both forms are typed. This does not mean that the same paralinguistic elements do not physically appear in all of these forms at one time or another. Large and small newspapers all use boldfacing and certain size typefaces, and personal and business letters do contain exclamation points and underscoring. But the types of paralinguistic features that appear and the ways in which they are patterned does significantly depend on the type or purpose of the writing and the intended audience.

Electronic Paralanguage

Medium and Recording Technique: Part I

The computer is the first personal medium of written communication which is not paper bound. Or phrased somewhat differently, it is the first personal medium of written communication between people which is entirely electronic.⁴⁷ Many paralinguistic elements in electronic mail are made possible by what is available using the computer's typewriter-like keyboard, and in some cases by the technical features of the computer system.

As illustrated by the features below, electronic paralanguage goes beyond traditional upper- and lowercase and the use of grammatical markers to include more elaborate and unique representations than those usually found in its closest relative, typescript. This is true even though the recording or writing technique available to people who use electronic mail, bulletin boards and computer conferencing systems is the same in all cases except for a few specialized applications. Hardly any computer user has access to more sophisticated techniques or forms of representation based on the type of writing or the intended audience, although those with computing experience can and often do use the keyboard and

47. There were, and are, other forms of electronic writing which preceded computer-mediated communication and which still exist, but cannot be classified as personal media. The electronic telegraph is one example of mediated electronic communication. One of the earliest and most recognizable forms of writing which was not paper based was the chemical writing of silent movie art titles, used effectively by Thomas Edison in 1905. Silent movie art titles became very popular and extravagant by the second decade of the twentieth century (Everson, 1978). Current forms include film titles and credits (Ong, 1982). What differentiates all of these forms from computer-mediated communication is that they are not *personal*, not controlled by the individual. The telegraph, for example, was not a personal instrument of communication since it was not in the home, and required a technical knowledge of Morse code. These other forms of electronic writing are also not controlled by the individual for an act of personal communication to one other or to many.

system features differently from those with less experience. One widely-used technical feature of the computer which is popular among all users, however, is repeating keys, which also are found on an electric and electronic typewriters.

Examples and Definitions: I

The only systematic examination of paralanguage in computer-mediated communication is found in Carey (1980), which serves as the starting point for this research. Through his analysis of the transcripts of two computer conferencing systems, Carey isolated the following elements and gave them preliminary designations as paralinguistic features:⁴⁸

1. Vocal Spellings
2. Lexical Surrogates and Vocal Segregates
3. Spatial Arrays
4. Manipulation of Grammatical Markers
5. Minus Features

1. Vocal Spellings. Vocal or "non standard spellings of words . . . bring attention to sound qualities [and] may serve to mark a regional accent or an idiosyncratic manner of speech. Often, the misspelling involves repetition of a vowel (drawl) or a final consonant (released or held consonant, with final stress)" (p. 67). Vocal spellings can also indicate various kinds of stress. Non-standard contractions also represent sound qualities. "A single contraction in a message appears to bring

48. All specific page references in this section are to Carey, 1980, unless otherwise indicated. Examples provided by Carey and reprinted here are taken from the transcripts of the Electronic Information and Exchange System (EIES) and Planet computer conferencing systems.

attention (stress) to the word. A series of contractions in a single message appears to serve as a tempo marker, indicating a quick pace in composing a message" (p. 67).

Vocal spellings

- a) biznis
- b) weeeeell
- c) breakkk

Contractions

- a) y'all
- b) Miami Dade Cmty Coll Life Lab Pgm

2. Lexical surrogates and vocal segregates. Lexical surrogates (word substitutes), and vocal segregates (sound substitutes) are used to indicate a tone of voice. Depending on their placement and how they are marked off they may apply to the entire communication or only to one sentence (pp. 67-8).

Lexical Surrogates

- a) What was decided? I like the idea, but then again, it was mine (she said blushing).
- b) Boo, boo Horror of horrors! ti65
DOESN'T seem to cure all the problems involved in transmitting files.

Vocal segregates, e.g., *hmmm*, *uh huh* and *yuk yuk* "are written commonly within the body of texts" (p. 67). Erving Goffman refers to these as response cries, or "exclamatory interjections which are not full-fledged words" (1981, p. 99).

3. Spatial Arrays. "Perhaps the most striking feature of computer conferencing is the spatial arrangement of words. While some users follow standard letter format,

others treat the page space as a canvas on which they paint with words and letters, or an advertisement layout in which they are free to leave space between words, skip lines, and paragraph each new sentence" (p. 68).

Spatial arrays "are actual graphics; arrangements of letters to create a picture" such as a Christmas Tree (p. 68). "In day to day messaging, users often leave space between words (indicating pause, or setting off a word or phrase), run words together (quickenning of tempo, onomatopoeic effect), skip lines within a paragraph (to set off a word, phrase or sentence), and create paragraphs to lend visual support to the entire message or items within it. In addition, many messages contain headlines, as in newspaper writing" (p. 68).

Spatial Arrays

a) One of the units here just makes an awfulhowling noise.

b) AAAAAAAAAA
MMMMMMMM
OOOOOOOO
SSSSSSSSSS

c) \$
When the next bill comes from
EIES/Telenet, you may also be interested

4. Manipulation of Grammatical Markers. "Grammatical markers such as capitalization, periods, commas, quotation marks, and parentheses are manipulated . . . to add stress, indicate pause, modify the tone of a lexical item and signal a change of voice by the composer" (p. 68). "Parentheses and quotation marks are used commonly to indicate that the words contained within them are to be heard with a different tone than the rest of the message" (Lakoff, 1984, p. 249).

Manipulation of Grammatical Markers

- a) Welcome Aboard!!!!
- b) This background is VERY important, since it makes many people (appropriately, I think) aware about the idea.
- c) THERE IS STILL SOME CONFUSION ON DATES FOR PHILADELPHIA. MIKE AND I ARE PERPLEXED!?
- d) At this point, I think we should include a BROAD range of ideas -- even if they look unworkable.
- e) Paul...three quick points.....first...the paper

5. Minus Features. "The absence of certain features or expected work in composition may also lend a tone to the message. For example, a user may not correct spelling errors or glitches introduced by the system. Similarly, he may pay no attention to paragraphing or capitalization. The absence of such features, particularly if they are clustered together in a single message, can convey a relaxed tone of familiarity with the receiver or quickness of pacing (e.g. when the sender has a lot of work to do and must compose the message quickly)" (p. 68).

Media and Recording Technique: Part II

Carey's analysis of paralanguage in two computer conferencing systems is an excellent base for an in-depth treatment of the phenomenon. Within the analytical framework for this research, his approach can be modified and expanded to reflect what within the last six years are the technical developments in computing and the increased popularity of computer-mediated communication systems. These revisions also specifically take into account the development and evolution of paralinguistic

features by many new users of electronic mail and bulletin boards, two styles of communication much more widely used than computer conferencing systems.

Of the five categories of features presented by Carey, Lexical Surrogates and Grammatical Markers seem to currently exist in computer-mediated communication systems in the ways in which he described them. Vocal segregates now appear in slightly more elaborate forms than Carey documented, and their origins may indicate a different function than he has identified, as explained below. Of the three remaining categories, Vocal Spellings has been given an additional definition, Spatial Arrays is revised with a new definition and set of features, and Minus Features has been subsumed under a new category. In total, three new categories of features have been added: Manipulation of Special Symbols, Text Forms, and Text Movement. Further, all of these categories now are ordered differently from Carey's original presentation, grouped together by similar or related features.⁴⁹ These revisions, modifications, and additions reflect the appearance of new paralinguistic features and new uses of old features. It is hoped that these changes contribute precise descriptions and definitions to make possible in-depth interpretations. The changes made to Carey's original categories are:

49. See the numbered list below and the Summary Overview, p. 135.

<u>Vocal Spellings</u>	Additional explanation of function
<u>Vocal Segregates</u>	Further explanations of origins and function and an additional example
<u>Spatial Arrays</u>	Modified with a new definition; certain features are removed and others are added
<u>Minus Features</u>	Subsumed under the new category of Text Forms. The latter also includes some features previously classified under Spatial Arrays
<u>Manipulation of Special Symbols</u>	New category
<u>Text Forms</u>	New category
<u>Text Movement</u>	New category

These revisions, by expanding Carey's categories from five to seven, enable broader and more complete classifications and definitions of paralanguage in computer-mediated communication. New and modified categories are indicated in bold:

1. **Vocal Spellings**
2. **Lexical Surrogates and Vocal Segregates**
3. **Manipulation of Grammatical Markers**
4. **Manipulation of Special Symbols**
5. **Spatial Arrays**
6. **Text Forms**
7. **Text Movement**

Examples and Definitions: II

All examples of paralanguage in this section were taken from public access electronic bulletin boards or group mailing lists, the researcher's own personal electronic mail, or created by this researcher for purposes of example but modeled closely on actual communication.⁵⁰ Since paralinguistic features are often used in various combinations, many of these examples also contain features other than those currently being demonstrated, but which fall within one of the other categories.

1. Vocal Spellings. Vocal spellings or contractions can be used as a time-saving typing device for those who send many messages. In certain cases, this use may not have any relation to sound qualities. When used solely to save time or typing, vocal spellings are "speedwriting" techniques.

Vocal Spellings

- a) r u clogging up the print queue?
- b) cld u pls return the book. thks.
- c) c u soon.

2. Vocal Segregates. Sound substitutes to indicate tone of voice appear often in the public and private electronic mail of some computer users, usually but not exclusively those who have spent a great amount of time using computer-mediated communication systems. Many of these expressions originated in and are borrowed from cartoons or comics. Vocal segregates such as "wham" and "arghh" for instance, can be as common to some (but hardly to all) users of electronic mail as they are to cartoonists. In that form of print communication, vocal segregates

50. No permission from the sender is necessary for the use of public or semi-public electronic communication. Permission has been granted by the sender(s) of personal mail to use these specific examples. In no instance has any sender been identified.

function to convey a great deal of information in a small space, such as in a single drawing or in one frame of a longer strip (Harrison, 1981; Wertham, 1953). Like some spatial arrays, they may achieve a very compact informational function in electronic mail.

In the example below, the vocal segregate *gak* supported by the asterisk special symbol sets the tone of the entire message. It is used to help show a very strong dislike of the Apple Macintosh computer:

Vocal Segregates

- a) Well, now that the dust has settled on some new products...
- 1) The Mac. *gak* I'm sorry, but this ain't the one, chillun. This might be a fine machine for 1st-time computerfolk (which I debate, but more on that in a sec), but for anyone who's the SLIGHTEST bit familiar with computers, it's a headache. . .

3. Manipulation of Grammatical Markers. This category remains unchanged from Carey's original definitions and examples.

4. Manipulation of Special Symbols. This includes any symbol⁵¹ on the computer keyboard used to mark off various parts of a message by surrounding certain words or phrases. Like the manipulation of grammatical markers these symbols, in order to be paralinguistic features, are used outside of their traditional or formal meaning, e.g., Apartment #2K uses the number sign for its traditional meaning, but in the expression @!#%^* it becomes a paralinguistic feature. Like grammatical markers, special symbols indicate degrees of stress, show pause, signal a shift in tone or changes of subject.

51. See below p. 132 for a more specific explanation of the available symbols and ASCII Code.

These special symbols are not grammatical markers, e.g., ! or ??, and are not used in the form of a spatial array. Most often they are found on the top (number) row of the computer keyboard by shifting to uppercase, although any symbol on the keyboard can be used. This includes the asterisk (*), number sign (#), up-arrow (^), plus sign (+) and ampersand (&), as well as right and left angle brackets (< >) and the or bar (|). Like grammatical markers, special symbols serve many different functions. An asterisk placed at the beginning and end of a word, like uppercasing, shows stress, and a string of asterisks in the middle of a message signals a change in subject. When grouped together special symbols can be the entire communication, as indicated in the first example below, where the function is to indicate extreme stress and in some cases to substitute for obscenities.

Two different types of symbols have more specific meanings. A leading and trailing underscore, e.g., word is a precise substitute for the unavailable formal underscore. Like uppercasing, it is used to indicate stress. Also, commands found in many different text formatters, when written literally or in their unprocessed form, indicate that the word or phrase is to be read as it would be output to paper after the formatter interpreted the command. This is an exact one-to-one correspondence to its printed meaning if the command is understood by the recipient. These features are used to indicate various kinds of stress and changes in tone. Popular commands used in this manner indicate italics, boldfacing and underscoring as demonstrated in the last example with the @b (boldface) command for the text formatter Scribe.

Special Symbols

- a) %@!#&^\$|*
- b) the cafeteria is *rarely* my first choice!
- c) _what's the point of all of this_
- d) @b[yes]

5. Spatial Arrays. A spatial array is defined in this research as the systematic spatial arrangement of characters to create a graphic or an identifiable image. This confirms Carey's idea of spatial arrays as "the spatial arrangement of words" on the screen and the "arrangements of letters to create a picture" or actual graphic to add emphasis or contrast to alphabetic text and to lend visual support to the message (p. 68). This definition does not include Carey's descriptions of the less dramatic kinds of spacing between words or between paragraphs. These features are now in the new category Text Forms, as explained on p. 127. This new definition is precise, and draws distinctions between elaborate graphics, such as a Christmas Tree, which require the systematic spatial arrangement of characters, and idiosyncratic or non-systematic and temporary arrangements of characters, words, sentences and paragraphs.

This new definition also includes the idea that some types of spatial arrays can provide as much information, and perhaps communicate more effectively than is possible with words. This would be much the same as the compact informational function of some of the vocal segregates described earlier, but in this case the information is supplied pictorially, in an image. This is demonstrated by the use of the dollar signs in Carey's example on p. 118.

This definition of spatial arrays is supported by examples of the more recent use on the computer of symbols, letters and numbers to create "faces" or face symbols, popularly and generically referred to as a "smiley face."⁵² Various combinations of symbols, letters, and numbers create several different kinds of faces which when viewed sideways create an image. Face symbols, particularly the "smiley-face" and the "frowney-face" originated in print and mass media in the early 1970's, and were not created by computer users. The many variations on the basic "smiley-face" however, would appear to be unique to computer-mediated communication.

Like other kinds of spatial arrays, face symbols serve many functions and can directly express a variety of emotions including humor, irony, sadness, unhappiness and anger. These symbols support or modify the written language when they are placed at the end of a sentence or message, or they can be the entire communication alone. Examples of face symbols from several different sources appear in Appendix C, p. 221. Many of these symbols, however, are local creations and therefore are unknown to many computer users. Two of the most popular face symbols, :-) and :-(are demonstrated in the following examples:

52. An anonymous poster on a local bulletin board recently referred to these face symbols as "emoticons" with the following definition: "emoticon: n. a figure created with the symbols on a keyboard that is read with the head tilted to the left. Used to convey the spirit in which a line of text was typed."

Spatial Arrays/Face Symbols

a) Humor or irony:

Interesting topic for your dissertation.

I'd certainly be interested in SEEING it @i(when)
it's done... :-)

b) Sadness or unhappiness:

I even consoled myself by going down to the local
store and buying more floppy disks, as if the poor Mac
was well, and not sick with a life threatening disease.
How I miss her! I even thought of sending flowers but I
didn't think the repair shop where she sits alone would
understand. *sigh*

I hope she lives; life just wouldn't be the same without her. :-(

6. Text Forms. Text Forms describe the types of paralinguistic features made possible through certain kinds of basic and technically sophisticated text manipulation, the latter accomplished using a text editor. These features can provide a contrast and indicate stress, pause, or different kinds of tones within a message. Text Forms provides a way of looking at certain types of presentations of text on the screen, including the entire message or individual parts. In most cases a Text Form is not as dramatic or as systematically patterned as a spatial array. This category is based on Carey's idea of Minus Features, and may in the future be replaced by other categories which describe certain features more specifically. It is formulated here with the understanding that while it may not be as precise as the other categories, it is a reasonable description by which to classify a wide variety of features used in many different ways and which cannot be classified elsewhere. The category of Text Forms subsumes Carey's Minus Features, and includes some of the features which he included in Spatial Arrays, as explained below.

Text Forms include different types of text arrangements such as spacing between letters and words, the justification of paragraphs or blocks of text, numbered or unnumbered lists, outlines, and "the absence of certain features or expected work in composition" such as the lack of paragraphing (Carey, p. 68). Text Forms, then, include Carey's idea of *absence* of features but extends more fully to encompass the idea of the *presence* of features, e.g., that a numbered or enumerated list gives an exact report or presents precise instructions, or that text with a right-justified margin should be read differently from regular unjustified text. Both lists and right-justified text may demonstrate formality, or indicate that the content should be taken very seriously. Text Forms also recognizes the alternation between "minus" and "plus" features, such as switching back and forth between prose paragraphs and numbered, indented lists, or between ragged and justified right margins, as well as between all lowercase and grammatically correct mixed case letters.

Certain kinds of features removed from Carey's Spatial Arrays category and placed within Text Forms further help to define the latter. These would be textual arrangements which do not form any kind of systematic spatial arrangement of numbers, words or symbols. Therefore, changing the spacing between individual letters of a word or the words themselves within the line of text, as well as certain varieties of spacing in other parts of the message, would be placed within the Text Forms category, as demonstrated below in the first example which Carey used in the category of Spatial Arrays, and also in the first line of the second example:

Text Forms

- a) One of the units here just makes an awfulhowling noise.
- b) To: The Entire Group
Subject: The Water Fountain

PLEASE, P L E A S E, P L E A S E do not dump ANYTHING in the water fountain. No coffee, no juice, especially no pineapple juice, NOTHING. This is to be used only for getting water. Having it fixed is a major job. They have to pull the thing apart. In the meantime, it is yukky to look at. Thanks for the cooperation.

- c) 1. turn off the mixer
2. take the mixer out of the bowl
3. frost cake

- d) Right-hand justified text:

I do not think you are correct in your analysis of anarchism and technology. Anarchism is an ideology which could only be practical--and possible--in a pre-industrial state. The technologies which fueled industrialism defeated anarchism. Please see my forthcoming article, "Emma Goldman, Her Typewriter, Her Printed Journal, and Her Railroad Schedules."

7. Text Movement. Text, or any symbol, can be made to appear to move across the screen, horizontally from left to right, by overwriting one letter on top of another. This places the same characters in different parts of the screen. By its very nature, text movement indicates that these words should be read differently from stationary text. Text movement indicates emphasis, and in some cases demonstrates extreme stress. Several kinds of text movement and combinations also make possible different features. Text movement can be smooth and constant if the spacing between each appearance is even, or choppy and inconsistent with uneven

spacing. Regular or constant text movement creates a regular rhythm, while uneven text movement creates long or short pauses.

For additional contrast and emphasis the moving word, words, sentence or symbol may be accompanied above or below or on the same line by stationary text. The moving text can also be the entire communication in itself. Moving text would not be a spatial array because the individual letters, words or symbols actually appear to be moving as the message is being read and do not form any type of graphic image. It should be noted, however, that text does not technically move. Through control characters, identical characters are written to different positions on the screen which then gives the *appearance* of movement. The appropriate control characters are inserted by the sender but are not seen by the recipient. This cannot be demonstrated on paper.

Other Features

Although technically not paralinguistic two other features, sound and right angle brackets, which often accompany or work in conjunction with paralanguage, should be noted. Sound in the form of a bell may be inserted at almost any point in a message. Primarily it functions to garner the reader's attention and to indicate various kinds of stress or pause. The bell may be rung once, or several times, and the elapsed time between each bell may be controlled to correspond to the appearance of various words, phrases or symbols. Also, depending on the technical aspects of the sound's creation and the receiving terminal's characteristics, the bell can ring very loudly. Sound can also be used in various combinations with moving text. In electronic mail, text movement and sound in the form of a bell are technical

tricks which are fairly easy to achieve, but most people do not know how to do either.

Finally, various numbers of right angle brackets > >> and >>> are often used as direct substitutes for formal quotation marks to indicate that lines are being taken or quoted from another message or another source.⁵³ This feature is not paralinguistic, since it substitutes strictly in a grammatical sense for quotation marks, and does not indicate that the words they mark off should be read or heard differently for stress.

Originally, tabs or indentations were used to show material taken from another source. This was first observed on Netnews, the UUCP news system, a very popular UNIX bulletin board and electronic mail application. Tabs were more dramatic than quotation marks and therefore easier to see, but took up too much space. As a replacement for tabs and a substitute for quotation marks, a single right angle bracket was placed at the beginning of the text in the extreme left margin as indicated below. In a large block of text they would appear to the left of every new line. They also mark single lines throughout the message, interspersed with the sender's own unmarked text, as shown below. Multiple levels are indicated with double right angle brackets, >>, triple right angle brackets, >>> etc. to show material taken from many different sources in one message. At times left angle brackets << at the end of the line in the right margin also are used.

What is particularly interesting about this feature is that Readnews, the Netnews mail application, in its include command for including material from another file, now *automatically* inserts a right angle bracket > to show the material

53. For the explanation of the development and current use of angle brackets I am indebted to Dr. Steven Bellovin, Bell Laboratories.

is from another file. This Readnews feature may help to create this convention as a standard among many computer users.

Right Angle Brackets

In case everyone needs a laugh...

> Does anybody have two tickets to the Springsteen concert tonight?

>> Sure, I have some. Stop by my office, No problem.

> I am willing to pay the going rate.

This mail is *definitely* from the ^^twilight zone^^

Type of Writing

The theoretical and technical aspects of the type of writing as they relate to the medium and recording technique are different for electronic mail than is the case for paper-based media.

Public and private computer-mediated communication is clearly divided between two separate applications, bulletin boards and electronic mail. Unlike the various influences of the recording techniques of paper-based writing, electronic public and private writing share the same technical capabilities. Basic representation is made possible in both by using many of the 128 ASCII⁵⁴ characters which can be transmitted between standard computer terminals and recognized by different kinds of computer systems. Only in a few cases, such as the Plato system, Bell

54. American Standard Code for Information Exchange. See Appendix C for the ASCII character set.

Laboratories Face Server,⁵⁵ or specialized document distribution systems, can graphics or typefaces be sent between users. Therefore the divisions between public and private writing are not significantly affected by recording techniques, since what is available to one is available to all.

Electronic Paralanguage: Functions and Definition

Within a context that provides for both similarities and differences it becomes possible first to identify and then to interpret what may be electronic paralanguage's unique functions and characteristics, those steeped in the medium, and which perform certain roles in communication that may not be found in other forms.

As demonstrated by Carey's and this researcher's examples and explanations, there are many different types of electronic paralinguistic elements, and they perform a variety of functions. Under this broad concept of electronic paralanguage, several different kinds of features accomplish additional or other meanings. While many or even all of these features, at one time or another, have overlapping or identical purposes, e.g., representations of stress, pause, or tone, the differences between them are perhaps more frequent and striking than the similarities. Particularly, the difference in the ways in which these elements are positioned in the visual channel, and their relationship to language and text.

Electronic paralinguistic elements can be identified by their position within the channel and by their purpose, and then grouped into three categories: *alphabetic*, *symbolic*, and *spatial*. *Alphabetic* paralanguage is the closest to written language

55. Face Server is a program which works in conjunction with a Unix-based electronic mail system. It displays a face image of the sender of an electronic mail message taken from a digitized photograph. Face Server requires a bitmap display.

because of its use of the alphabet, and this makes it a part of the text; *symbolic* paralanguage is further removed from written language because it is more visual and tersely coded than the alphabet and thus appears different from alphabetic text, and *spatial* is the most removed from written language because it is entirely visual and often depends on the text around it for contrast.

Alphabetic Paralanguage

Vocal spellings which call attention to sound qualities, and lexical surrogates and vocal segregates which substitute for tone of voice, invoke the oral-aural channel. They act directly as voice substitutes, and thus any additional or new meanings they present may be interpreted within the framework of spoken language, perhaps even within the realm of conversation. Their position in the visual channel is not particularly different from regular words, sentences or phrases, since these elements also are composed of alphabetic characters; they are often "non-word words" that share the same alphabetic code as real words. However, their connection to orality may lend an interpretive contrast to written language. By virtue of their function, then, these kinds of features may lend a property of orality to this written medium which may provide for interpretive contrast, but they do not provide significant contrast in the visual channel.

Electronic Paralanguage: Summary Overview

<u>Category</u>	<u>Description</u>	<u>Function</u>
<u>I. Alphabetic</u>		
Vocal Spellings	Vocal or non-standard spellings of words; non-standard contractions; single and multiple contractions in a series	Attention to sound qualities; idiosyncratic speech; stress; tempo; time-saving typing (speedwriting); interpretive contrast to written message
Lexical Surrogates and Vocal Segregates	<u>Word and sound substitutes</u>	<u>Tone of voice;</u> <u>interpretive contrast to written message</u>
<u>II. Symbolic</u>		
Manipulation of Grammatical Markers	Punctuation symbols used outside of grammatical functions to mark off letters, words or phrases	Stress; pause; tone; visual contrast to alphabetic text
Manipulation of Special Symbols	Any symbol, not including grammatical markers used to mark off letters, words, phrases, or various parts of the message	Stress; pause; tone; visual contrast to alphabetic text
<u>III. Spatial</u>		
Spatial Arrays	The systematic <u>spatial arrangement</u> of text using alpha-numeric characters and symbols to create a graphic or identifiable image	Visual support to message; emphasis; visual contrast to alphabetic text
Text Forms	The variety of <u>text arrangements</u> made possible through basic and technically advanced text manipulation	Stress; pause; tone; visual contrast to text
Text Movement	The horizontal movement of any character, word, words, numbers or symbols	Stress; regular and inconsistent rhythm; extreme visual emphasis; attention; visual contrast to text

Symbolic Paralanguage

Conversely, grammatical markers and special symbols highlight the visual channel and often work within the boundaries of written language as grammatically correct forms of emphasis. These elements do not share the same alphabetic code as words, but are more tersely coded. They are not written in the same ways as are vocal spellings and lexical surrogates, and are not as spatially oriented or dramatic as spatial arrays, text forms or text movement. As a result, they function within the visual channel by providing a physical contrast to alphabetic text, and are interpreted semantically in the traditional sense as stress, emphasis, tone or pause. While these paralinguistic features may also in some ways be "heard" by the recipient, as are vocal spellings, they usually are still more physically contrastive than oral-aural features since they are coded into a symbol system other than the alphabet.

Spatial Paralanguage

Spatial arrays, text forms, and text movement significantly exploit the visual channel. They are more contrastive to the text of written language than are alphabetic or symbolic elements and do not share the codes of either form. Spatial arrays are actual graphics or identifiable images which do not share the alphabetic code or physical appearance of linguistic text. Text forms and text movement can be alphabetic or non-alphabetic, but often depend on a physical contrast to standard written text for their effect.

Electronic Paralanguage

Keeping in mind the differences in the elements as explained above, interpreting the functions of electronic paralanguage requires careful attention to all of these different aspects: when can all of these elements can be interpreted together, and when can they be interpreted separately? This is explored in the following analysis.

All electronic paralanguage, whether alphabetic, symbolic or spatial is *visible*, although eye movement does not allow for equal focus on every paralinguistic feature. Because each feature is not only visible, but also retrievable, it may be scanned repeatedly. Thus unlike spoken paralanguage, which is as fleeting and temporary as language, electronic paralanguage has a far greater chance of being noticed within the communication than is true of spoken paralanguage.

No electronic paralinguistic element ever is accompanied by any type of spoken or nonverbal communication, and as a result, it is positioned within the text as its exclusive nonlinguistic element. In one sense, this indicates that the medium is "information poor" since it lacks the redundant properties provided by spoken and nonverbal communication. In another sense, it means that electronic paralanguage cannot easily be obscured by any other form because of its solitary nature. Because paralanguage provides information over and above the literal meaning, it is computer-mediated communication's internal and principal form of redundancy, or the means by which additional signs or rules prevent mistakes in the reception of the message. This is not to imply that its redundant properties provide too little, too much, or just enough additional information to convey the intended meaning, but only that in computer-mediated communication paralanguage is unobscured and is the principal means of redundancy.

Because all electronic paralinguage is visible and retrievable, and therefore can be a repeatable experience for the recipient, and because it is a solitary form which works without nonverbal or spoken cues, it is perhaps more contrastive to written language in the visual channel than is spoken paralinguage to spoken language in face-to-face communication. This would be particularly true for those elements which highlight the visual channel, that is, symbolic and spatial paralinguistic elements. It often is true that single or multiple exclamation points, question marks, asterisks and other markers and symbols, as well as frequent use of uppercase letters, lists, text movement or graphics—occurrences that significantly exploit the inherent visual property of the medium—provide considerable contrast to the linguistic text. And since these elements are unaccompanied by other types of communication, this contrast may be even more heightened or more noticeable to the reader or recipient. The alphabetic features which make use of the oral-aural channel, such as vocal spellings and lexical surrogates are also contrastive, but in a different way. Since they invoke spoken properties within the written sphere, they provide interpretive contrast within this communication.

Electronic paralinguage often shares a permanence with written paralinguage; they are all part of a repeatable experience. Yet electronic paralinguage may not be more visually contrastive than paper-based written paralinguage. Computer text is homogenized: each character is the same width and height and the same color. Written paralinguage may be more contrastive to the actual text of written language since it utilizes different widths and heights, color, point sizes and typefaces.

The major properties of electronic paralinguage in relation to the medium in which it appears are that it always solitary, and often is permanent and repeatable. These

attributes mean that it is noticed. Because it is noticed it has contrast, and within this channel the type of contrast, either visual or interpretive, depends on the individual element.

Therefore electronic paralinguage is positioned between spoken and written paralinguage in its visual and interpretive structures: it is unique. It can lend orality as well as support literacy depending on what feature is used. It is not exclusively spoken or written paralinguage, but a form unto itself, defined by its own properties, attributes, and functions. Paralinguage in computer-mediated communication, then, deserves its own name, and it has been given one in this research. The term electronic paralinguage includes all of the factors explained herein.

Definition

Based on Carey's earlier work and this researcher's present analysis, electronic paralinguage is defined as: features of written language which are used outside of formal grammar and syntax, and other features related to but not part of written language, which through varieties of visual and interpretive contrast provide additional, enhanced, redundant or new meanings to the message. //

Chapter VI

Electronic Mail Usage

Rank and General Messaging Activity

For these respondents, messaging activity was different by rank in those situations related to the computer task. Rank also appeared to be a factor in the length of messages in almost all categories. Attitudes by rank which can be attributed to these differences included the respondents' use of the computing facilities, technical expertise, and attitudes about the appearance of their own messages. With the exception of computer task related messages, rank did not appear to be a factor in the number of messages sent or in the frequency of messaging.

In some cases, group statistical portraits of general messaging behavior are accurate measures of activity, while in others, the uneven number of respondents in each group and the uneven distribution of messages by individual makes observations based on individual behavior more reliable measures of what actually occurred. For general messaging activity, as well as for the use of paralanguage, this is part a result of the small sample size.⁵⁶ As a result, in those cases where group averages by rank are presented they are supported by the results of individual messaging behaviors.

⁵⁶ For similar considerations in the analysis of the use of paralanguage, see below p. 150.

Number of Messages

As shown in Table D.1, p. 229, of the 128 messages sent to the instructor, the ten novice respondents sent 83 messages, and the six advanced respondents sent 45, slightly less than half of the novice total. Novice respondents sent slightly more messages, an average of 8.3, compared to the advanced respondents' average of 7.5 messages. There was no apparent relationship by rank to the number of messages sent in all categories, with the exception of messages related to the computer tasks. Further, there was no relationship by rank to the frequency or duration of messaging. This is supported by individual behavior.

The attitudes towards the electronic mail requirement, in all but one case, was not a factor in the number of messages by rank. Of the two novice respondents who resented the computer fee, one sent 3 messages, the lowest number of both groups. The other novice respondent sent 8 messages, more in the mid range, but since she worked in the Library School computer lab her access to the computer was much more convenient than all other respondents, which may have accounted for the number of messages. One novice respondent who did not believe the use of the computer was related to the course sent 17 messages, the highest number in both groups.

Length of Messages

Attitudes about the appearance of the mail messages was a factor in the length of the messages sent according to the rank of the respondent. The average length of novice respondent messages was 492 characters. The average length of advanced respondent messages was 627 characters. Although the instructor assured the

respondents that they would not be negatively judged because of spelling or typographical errors in their messages, some expressed the belief that this judgment was being made by the instructor unconsciously, and would reflect in their grades or lower her opinion of them. This belief existed primarily among the novices, and might have resulted in few elective or personal messages, as well as shorter task-related messages. It was easier to avoid unwanted judgments by the instructor simply by completing the required communication and getting off of the system. Interview data revealed that the advanced respondents were largely unconcerned with the appearance of their messages or what the instructor thought of them because of it. This may account for the longer length of advanced messages.

Type of Messages

Written Task Related Messages

As shown in Table D.2, p. 230, among the seven message categories,⁵⁷ the respondents' communication to the instructor about the written task, i.e., the term paper, accounted for the highest number of messages, 57. Respondents gave written task related information in 54 messages, and asked for information in 3. Of the basic message categories, Written Task Related Communication also had the widest distribution among the respondents both by group rank and individually, which allows for a meaningful average for each group. Novice respondents sent a total of 37 messages, an average of 3.7 messages per respondent, and advanced respondents

57. Asking for Computer Task Related Information, Giving Computer Task Related Information, Asking for Written Task Related Information, Giving Written Task Related Information, Giving General Class Information, Personal and Other.

sent 20, for an average of 3.3 messages per respondent. These averages are somewhat closer than the averages for the total number of messages.

Because electronic mail served as a substitute for office hour communication about the written term paper assignment, it is reasonable that the highest number of messages from both groups would concern that task. This messaging activity was consistent with the task related purpose of the communication.

Computer Task Related Messages

Messages relating to the computer tasks, 49, accounted for the second highest number of messages among the communication categories. Distribution by rank and individual, however, was extremely uneven. These messages were sent primarily by novice respondents. Novices sent 40 messages relating to the computer tasks, of which 33 gave computer task related information and 7 asked for information. But these messages were not evenly distributed among the novice respondents. Of the ten respondents, two did not send any computer task related messages, and three sent only 1 message each. Advanced respondents sent only 9 messages relating to the computer tasks, and one respondent did not send any computer task related mail.

It is unsurprising that novices would send a much higher number of computer task related information than would advanced respondents. While both groups took the computer assignments seriously, at least half of the novice respondents worked harder to make sure the tasks were successfully completed, and communicated more often to the instructor about their activities than did advanced respondents.

Personal Messages

Personal messages accounted for the third highest number of messages sent, 16, which was well below the number of messages sent relating to the written and computer tasks. Regardless of rank, the respondents did not send many personal messages, but distribution by individual was very uneven within this category since only seven respondents sent personal messages. Three novice respondents sent a total of 4 personal messages. Advanced respondents sent 12, and of these, one advanced respondent accounted for 7 messages with only three others sending personal mail.

This low number of personal messages is not indicative of the amount of personal information exchanged between the respondents and the instructor, however. Many sent personal information in task related messages, often at the very beginning or end of their messages. Personal information included as a part of the task related messages was usually brief. Nor is this number indicative of the respondents' attitudes toward the use of electronic mail, their personal feelings about the instructor,⁵⁸ or for some, an increased openness and informality in their communication.

The low number of messages which were solely personal and their uneven distribution may be attributed in part to the non-elective and task-related nature of the communication, particularly since messages related to the written task accounted for the highest total and most even distributions among both ranks. The respondents may not have felt inclined to send personal mail in a situation where communication was a required assignment, and as well important to their success in

58. As explained on p. 39

the course. This would be particularly true for novice respondents, who were hampered by the lack of facilities and concerned about the instructor's opinions of them based on the appearance of their mail messages.

Several technical factors may also account for the low number of personal messages. Many novice and advanced students, both commuters as well as those who lived nearby, exhausted their prime time system limits and were forced to work early in the morning or on the weekends, an inconvenience which may have discouraged elective communication. Some novice respondents, because of their inability to manage their mail files and monitor their disk space, had several task-related messages aborted. These unpleasant experiences may have discouraged them from sending personal mail, or mail not directly related to the assigned task.

The low number of personal messages may also be attributed to the fact that the respondents had regular formal and informal in-person contact with the instructor. All respondents met formally with the instructor, in class, once a week, and many spoke to her informally before and after class. In addition, some respondents did take advantage of office hours for both task related and personal communication, and many saw her in passing in and around the Library School office. As a result, those who wished to establish personal relationships may have done so in person instead of electronically, since many opportunities for the former did exist.

In any situation, it is clear that not every respondent would have attempted to establish a friendly or more personal relationship with the instructor. Yet here, electronic mail combined with regular in-person contact, technical problems with the communications medium, and the complementary relationship introduces some interesting questions. Although these questions are beyond the scope of the present

research, they do at least indicate that personal communication in electronic mail is complex and cannot be analyzed solely in light of the "information poor" characteristics of the medium itself.

Asking and Giving Information

It is interesting to note that the overwhelming majority of task related messages sent by both novice and advanced respondents were *giving* information rather than *asking* for information. Only 7 novice messages asked for computer information, while advanced respondents sent only 2 messages of this type. Similarly, novice respondents sent only 3 messages asking for written information, while advanced respondents sent no messages of this type. For the most part, in both the computer and written task related situations, novice and advanced respondents approached the assignments by presenting the work or research they were planning to undertake or had already completed, rather than positing a series of questions to the instructor about either type of task. Although a comprehensive analysis of this particular behavior is outside the scope of this study, since it would relate more to instructional uses of the medium, the idea of presenting information and the sharing of ideas within this electronic mail situation would not appear to be very different from more traditional office hour communication. A comparative study of communication in traditional in-person office hours and on similar electronic mail communication would indicate if the pattern found in this research can be traced to the more traditional situation.

Instructor Mail

All of the instructor's messages were replies to respondent mail. As a result, the distribution of her mail matches almost exactly, and in some cases exactly, that of the respondent mail, regardless of rank or subject. The instructor sent a total of 120 messages: 48 written task related messages, 47 computer task related messages, 15 personal, 7 other, and 3 general. Of these, 78 were sent to novices, and 42 to advanced respondents. The instructor answered the advanced respondents longer written task related messages with longer replies than those she sent to the novices. Instructor written task related replies to advanced respondents averaged 630 characters per message, while mail to the novices averaged 437 characters per message. In all cases instructor mail was shorter than respondent mail except for those messages related to the computer task. Instructor mail to novices regarding to computer task averaged 379 characters per message, while novice respondent mail averaged 318 characters per message. The longer length of the instructor mail in computer task related messages can be attributed to the many technical instructions and examples she provided for the respondents in regard to the various computer tasks.

Summary

These data suggest that the rank of the respondent influenced the type of messages sent in relation to the computer task, which for novices was indicative of their inexperience with the medium. In this situation it was clear that the novices sent more messages because they were less technically skilled and therefore worked harder to fulfill certain computing requirements than did the more advanced

respondents, who either knew the computing environments or were less concerned about their ability to learn the system and to complete the assignments.

These data also suggest that the longer length of advanced messages may be attributable to the fact that these respondents felt more comfortable with the medium than did the novices, and also were able to edit or change their messages. It is possible, since advanced respondent were more comfortable with electronic mail, that they might have had a slight advantage over the novices in regard to communication about the term paper, but it cannot be known what impact, if any, this had on the quality of their work. Perhaps if novice respondents had felt more comfortable with the medium they would have sent longer written task related messages.

These data do not indicate that rank was a factor in the number of messages sent in categories other than those relating to the computer task, or to the duration or frequency of messaging.

For both groups, message distribution heavily favored the written task. Common to most respondents, then, was the belief that the completion of the written task was the most important aspect of this computer-mediated communication.

Chapter VII

Paralanguage in Electronic Mail

Analysis of Paralanguage in Electronic Mail

The systematic exploration of paralanguage in these electronic mail messages reveals an interesting portrait of how this type of communication combined with a variety of factors such as rank and task type. It was not expected that the kinds of paralanguage found in this small universe would demonstrate most known paralinguistic features, or even be as varied as those mentioned earlier. Indeed, several paralinguistic elements identified by Carey and this researcher are absent from these messages. Yet these respondents used many different paralinguistic elements in several kinds of communication, selected them for a variety of purposes, placed them differently within messages, and arranged them in various combinations. In some cases, usage according to rank and type of communication is clearly demonstrated, while in other situations the reasons for the use of certain features are far less clear and the explanations must be found elsewhere.

As was true of the general messaging activity,⁵⁹ group statistical portraits of paralinguistic usage are not always a meaningful measure of activity because of the small sample size and the uneven division of respondents in each group. Therefore conclusions have to be supported by examinations of individual messaging activity. In the same manner as the general messaging analysis, in those cases where group or overall averages are presented they are supported by the results of individual messaging behaviors.

59. See above, p. 140.

Table 1

Distribution of Paralanguage by Category, Feature, and Rank of Respondent

<u>Category/Feature</u>	<u>Rank/Appearance</u>		
	Novice	Advanced	Total
1. Vocal Spellings	0	2	2
2. Lexical Surrogates/ Vocal Segregates	3 1	1 0	5
3. Manipulation of Grammatical Markers	75	40	115
a. Capitals/Uppercasing	10	3	13
b. Ellipses	7	4	11
c. Exclamation Point(s)	44	13	57
d. Parentheses	2	9	11
e. Question Mark	2	0	2
f. Question Marks	3	0	3
g. Quotation Marks	5	11	16
h. Square Brackets	2	0	2
4. Manipulation of Of Special Symbols	0	1	1
5. Spatial Arrays	0	1	1
6. Text Forms	26	17	43
a. Salutation/Text	17	5	22
b. Outline	4	4	8
c. Short Lines	2	0	2
d. No Lines Between Paragraphs	2	0	2
e. List/Bibliography	1	1	2
f. List/Msc./Numbered	0	2	2
g. Poetry	0	5	5
7. Text Movement	0	0	0
Total:	Novice: 105	Advanced: 62	167

The findings show that there were both differences and similarities in the use of paralinguistic features by these two groups of respondents. In one specific area, novice communication about the computer tasks, the difference in the use of paralinguistic features by rank was clearly tied to the nature of the task.

Almost all respondents, regardless of rank, sent more of their total number of messages with paralinguistic features than without. But novice respondents sent far more paralinguistic features in task-related messages, and the most frequently used feature was exclamation points, which were almost completely absent in all types of advanced respondent messages except in the case of one respondent. Regardless of rank, the most popular category was the Manipulation of Grammatical Markers. No clear patterns were established in this category outside of the use of exclamation points. The second most popular category, regardless of rank, was Text Forms, but distributions among the advanced respondents were extremely uneven. Finally, both novice or advanced respondents sent few if any features classified in the other categories, that is, Vocal Spellings, Lexical Surrogates and Vocal Segregates, Manipulation of Special Symbols, Spatial Arrays, and Text Movement. The low or zero totals in these categories to some extent do indicate similarities by rank. Yet without specific contexts for analysis it is difficult to know how to interpret the absence of these features. These findings, then, may be more relevant to a general portrait of paralinguistic features in electronic mail rather than to group or individual behavior.

Novice respondents, both individually and as a group, had a greater amount of paralinguistic activity than did advanced respondents.⁶⁰ Novice respondents used a

60. See Figure E.1, p. 239 and Table 1, p. 151

total of 105 paralinguistic features, and advanced respondents used 62. Although both groups averaged 10 paralinguistic features per respondent, upon examination of individual behavior it is revealed that novice paralinguistic activity was marked by more even distributions among the respondents than was true of advanced paralinguistic activity, which was marked a smaller variety of paralinguistic features and uneven distributions among group members.

In certain cases, rank was a very strong determinant of the specific type of paralinguistic feature which was used, as summarized in Table 1. In some instances this related to the type of communication, as shown in Tables E.1, p. 231, and E.4, p. 234. Specifically, there was a high incidence of exclamation points in novice computer task related messages, and, to a lesser extent in written task related messages. This was in contrast to the very low number of exclamation points used by all but one advanced respondent in all messages.

Detailed contextual analyses of the use of exclamation points in novice task related messages reveals a more precise portrait of what these exclamation points represent: the many characteristics of stress. Particularly, that the majority of stress accompanying the communication in these messages was more often positive than negative, that there were several specific types of both positive and negative stress, that negative stress was more varied and active than positive stress, and that stress almost always referred to the respondent rather than to the instructor.

Of the seven paralinguistic categories created for this research, the category Manipulation of Grammatical Markers, totaling 115 features among all respondents in all communication categories was the major type of paralanguage used in these messages regardless of rank. The most widely used features were exclamation points (57), and to a lesser extent quotation marks (16), capitals or uppercasing (13) and

ellipses (11). All but one respondent, an advanced user, sent at least 1 grammatical marker. The distribution of specific elements within this category by both rank and individual was not always even, however.

Text Forms, totaling 43, was the second highest category among all respondents regardless of rank. The most widely used features were lack of spacing between salutations and text (22), to a lesser extent term paper outlines (8), and a variety of numbered and unnumbered lists, including bibliographies (4). Not all respondents sent text forms, and the distributions of the individual features was extremely even.

Rarely present were features in the categories Vocal Spellings, Lexical Surrogates and Vocal Segregates, Spatial Arrays, and Manipulation of Special Symbols, and Text Movement did not appear at all. The distribution of paralanguage by major category and individual feature is summarized in Table 1, p. 151. A list of the features which were used infrequently appears on p. 245.

General Paralinguistic Activity

A summary total of messages with and without paralanguage indicates that the respondents sent more messages with paralanguage than without. Of the 128 messages sent by the respondents, 84 or 66% contained 1 or more paralinguistic features, 44 messages or 34% contained no paralanguage.⁶¹ An analysis of individual messaging behavior supports the idea that regardless of rank, most respondents sent more of their total number of messages with paralanguage than without as shown below in Table 2, below, and in Figure E.2, p. 240.

⁶¹. See Tables D.1 p. 229 and Table D.2 p. 230 for a general summary and Table E.1 p. 231 and Table E.2 p. 232 for distribution by type of message.

Table 2Percentage of Total Messages With Paralanguage by Individual

100%	70%-99%	50%-69%	0-30%
3 Novice 1 Advanced -- 4	3 Novice 2 Advanced -- 5	1 Novice 2 Advanced -- 3	3 Novice 1 Advanced -- 4

Individual messaging activity also indicates that regardless of rank there was a slight increase in paralinguistic activity when compared to the number of messages sent, as shown in Figure E.1, p. 239. That is, the more mail one sent, the more paralanguage one sent. Frequency of participation, then, would appear to be a factor in the use of paralanguage, but no pattern existed to show that there were qualitative or quantitative differences in the use of paralanguage in relation to the frequency or duration of participation.

The total number of characters was higher for those messages with paralanguage than without, as shown in Table D.1, p. 229. Messages with paralanguage totaled 52,020 characters, while those without paralanguage totaled 17,024. However, this figure changes when the number of characters for the actual paralinguistic feature(s) is subtracted to determine the number of characters of the actual message text. Since there can be no reliable number for the average amount of characters a paralinguistic feature occupies per message, 10 characters per message where n is the number of paralinguistic features per message is a reasonable projection. With 840 characters deducted from the total, the number of characters of messages with paralanguage changes to 51,180, still more than 3 times the number of characters in messages without paralanguage. Advanced messages with paralanguage appeared to be somewhat longer than novice messages, which

corresponds to the difference between the two groups' general messaging activity in this area. Group statistics and individual messaging behavior supports the idea that the text of messages with paralinguistic features was longer than the text of those without.

Grammatical Markers and Rank of Respondent

The highest number of paralinguistic features occurred in the written (75) and computer task (61) related messages as shown in Table E.3, p. 233. This corresponds to the general messaging activity where these two categories accounted for the highest number of messages sent, and in the case of written task related information, the most even distribution among all respondents. The two prominent paralinguistic categories in this general messaging activity, Manipulation of Grammatical Markers and Text Forms, were also clustered in the written task related messages for both groups (72), and for novices, in the computer task related messages (52) as well, as shown in Tables E.4 and E.5, pp. 234 and 235.⁶²

The respondents were most equal in their messaging about the written task, sending very close to the same number of messages with paralinguistic features. However, while the two categories of paralinguistic features, Manipulation of Grammatical Markers and Text Forms remained high by the message type, there were differences by rank and the distribution among the individual respondents, as demonstrated in Figures E.3, p. 241 and E.4, p. 242, respectively. Specifically, that grammatical markers used by novice respondents in the written and computer task categories

62. As a result of the small number of messages in these two categories that *asked* for information, and upon further examination that the paralinguistic features in these messages was not different from those that *gave* information, the asking and giving categories for written and computer task related information were for purposes of further analysis collapsed and considered under the two general headings of Written Task Related Information and Computer Task Related Information.

indicated higher paralinguistic activity among more group members than was the case for advanced respondents.

Exclamation Points

Upon further examination, the differences between the two groups were the individual paralinguistic element, the number of times it appeared, its distribution, and the type of communication in which it was used. Specifically, that novice respondents sent more exclamation points in all task related messages than did advanced respondents, and this element was widely distributed among the former group, as demonstrated in Figure E.5, p. 243 and Table E.4, p. 234.

Novice respondents sent a total of 25 computer task related messages with paralanguage. Of these, 19 messages contained 28 exclamation points. They sent a total of 24 written task related messages with paralanguage. Of these, 10 messages contained 12 exclamations. In total, 29 messages task related messages contained 40 exclamations. As indicated in Figure E.6, p. 244, exclamations were more active in the computer messages than in the written task messages, due in part to the increased use of exclamation points by 3 respondents who sent few exclamations in the written task related messages.

Capitals or uppercase letters, which serve a function similar to exclamation points, were not widely used. Only 10 uppercase words or phrases were sent by only 4 novice respondents in computer and written task related messages. There may be several reasons for this. Theoretically, capitals indicate a different kind of stress than do exclamations. And technically, exclamation points are easier to key in on a computer terminal than are capital letters. Capitals visually highlight a word or group of words, while an exclamation applies more easily to the entire thought.

Exclamations need less forethought for stress, and can easily be entered at the very end of a word, sentence or paragraph. Demonstrating stress with capitals or uppercase letters requires slightly more forethought, that is, it had to be decided that the word or words should be in uppercase before they are entered, otherwise they would have to be deleted and re-keyed in uppercase. In those situations where the terminals would not allow the respondent to backspace or delete a word previously entered, this would have been impossible. It also might be the case that since terminal behavior was often out of the control of novices, they did not want to risk putting the terminal permanently into uppercase by depressing the shift key.

The Paralanguage of Novice Respondents

The Function of Paralanguage

The previous analysis clearly shows that exclamation points had the highest totals and widest distributions among novice respondents in written and computer task related messages, with slightly higher totals and somewhat more dramatic distributions in computer task related messages.

Given these results, it would be fairly easy to interpret the high number of messages in both categories to the preponderance of exclamation points as ample evidence that novice respondents showed more stress, excitement, or anxiety in their communication than did advanced respondents. And further, that this was most probably negative stress, particularly in their computer task related messages. The assumption that this was most likely negative stress would be logical in light of the trouble they had with the various computing environments, equipment, and as well their overall inexperience with computers and with electronic mail. To support this

idea we can turn to the venerable Fowler's *Modern English Usage* which reminds us that "Excessive use of exclamation marks is, like that of italics, one of the things that betray the uneducated or unpractised writer" (p. 590). These respondents were not uneducated, but in electronic mail, clearly "unpractised." Fowler, however, never had to wrestle with a terminal that would not backspace or a permanently stuck shift key.

Technical considerations and problems aside, however, these conclusions still may be correct. But it says little more than that exclamation points indicate some kind of stress, or an excited tone in the communication of people who lack experience with the medium. Moreover, simply citing the number of exclamation points does not move past a general quantitative conclusion. No matter how accurate a representation these numbers are of individual and group activity, they offer little understanding of exactly why this type of paralinguage appeared and what it was meant to accomplish. If paralinguage functions as an indicator of the character of communication, does it function only for broad, imprecise conclusions, or can it offer a more focused picture of the communication?

Contexts for Interpretation

A more robust and accurate picture of the character of the communication is revealed by interpreting paralinguistic elements in various contexts. This is demonstrated in the following analysis of exclamation points among novice respondents.

The broad context for interpretation has already been established: the experience of the respondent and the type of communication, specifically, novice

respondents sending written and computer task related electronic mail to a superior. More specific subcontexts highlight the individual paralinguistic element, in this case exclamation points, and provide a sharper focus on the nature of the communicative activity.

The specific subcontexts used in this analysis, which were created through examinations of the actual usage in these messages, include: 1) the various types of negative and positive stress these exclamation points represent, 2) exactly what subject they relate to within the general category of the task message, 3) whether they are used in relation to the respondent (personal report) or apply as well or exclusively to the instructor (other report), and 4) what kinds of combinations of positive and negative stress can be identified. Finally, the use of exclamation points out of the novice context is possible. The examination of one very experienced advanced respondent who sent several exclamation points provides a different perspective in regard to their functions.

As demonstrated below, these subcontexts reveal that the idea of stress does not have to remain as a vague description, but can be identified according to function. Stress is analyzed in two ways: first as a means of depicting emphasis through the exclamation point marker and, secondly as an indicator of a psychological state. Stress is revealed to have several different kinds of specific positive and negative characteristics. In all but two cases, stress was applied to information relating only to the respondent. Also, stress was expressed in various combinations. And finally in some instances it was applied to subjects very different from what the initial identification of the message indicated.

The Varieties of Stress

Five kinds of negative stress and 4 kinds of positive stress, as well as 3 combinations of the negative categories were found in these written and computer task related messages (Tables 3 and 4 and Figure 1, below). General stress, categorized as Excitement, was both positive and negative, as was Surprise. Opposites in negative and positive stress were correlated as Anger/Mock-Anger and Failure/Success. Frustration, a category of negative stress, had no opposite positive stress.

Table 3

Categories of Stress for Novice Respondents

<u>Negative</u>		<u>Positive</u>	
1)	Excitement	1)	Excitement
2)	Surprise	2)	Surprise
3)	Anger	3)	Mock-Anger
a)	Anger/Frustration		
b)	Anger/Failure		
c)	Anger/Frustration/Failure		
4)	Failure	4)	Success
5)	Frustration		

It was known that more stress would be found in the computer-task related messages, since that category had the higher number of exclamation points, 28. Initial identifications indicated that 16 were positive and 12 were negative. Written task related messages had a lower number of exclamation points, 12. Initial identifications indicated that 7 were positive and 5 were negative.

However, subsequent examination showed the existence of cross-over stress, or stress related to a subject opposite that of the main message category. There were 6 instances of cross-over stress: 4 instances of negative stress concerned directly with the general use of the computer and/or the computer assignments, which included electronic mail, the finger-plan and the use of the text editor, were identified in the written task related messages, and 1 instance of positive stress, concerned directly with the electronic mail task, were identified in a written task-related message. With these 5 instances of cross-over stress grouped according to subject, i.e., added to the computer subjects and subtracted from the written subjects, the actual distribution of stress changes, as shown in Table 4, and more completely in Table E-6, p. 236, and in Figures 1-4, below.

Table 4

Summary Distribution of Positive and Negative Stress for Novice Respondents

				<u>Total</u>
<u>Computer</u>	33	<u>Written</u>	7	40
Positive	17	Positive	6	23
Negative	16	Negative	1	17

Figure 1: Graphic Distribution of Computer Related Positive Stress for Novice Respondents

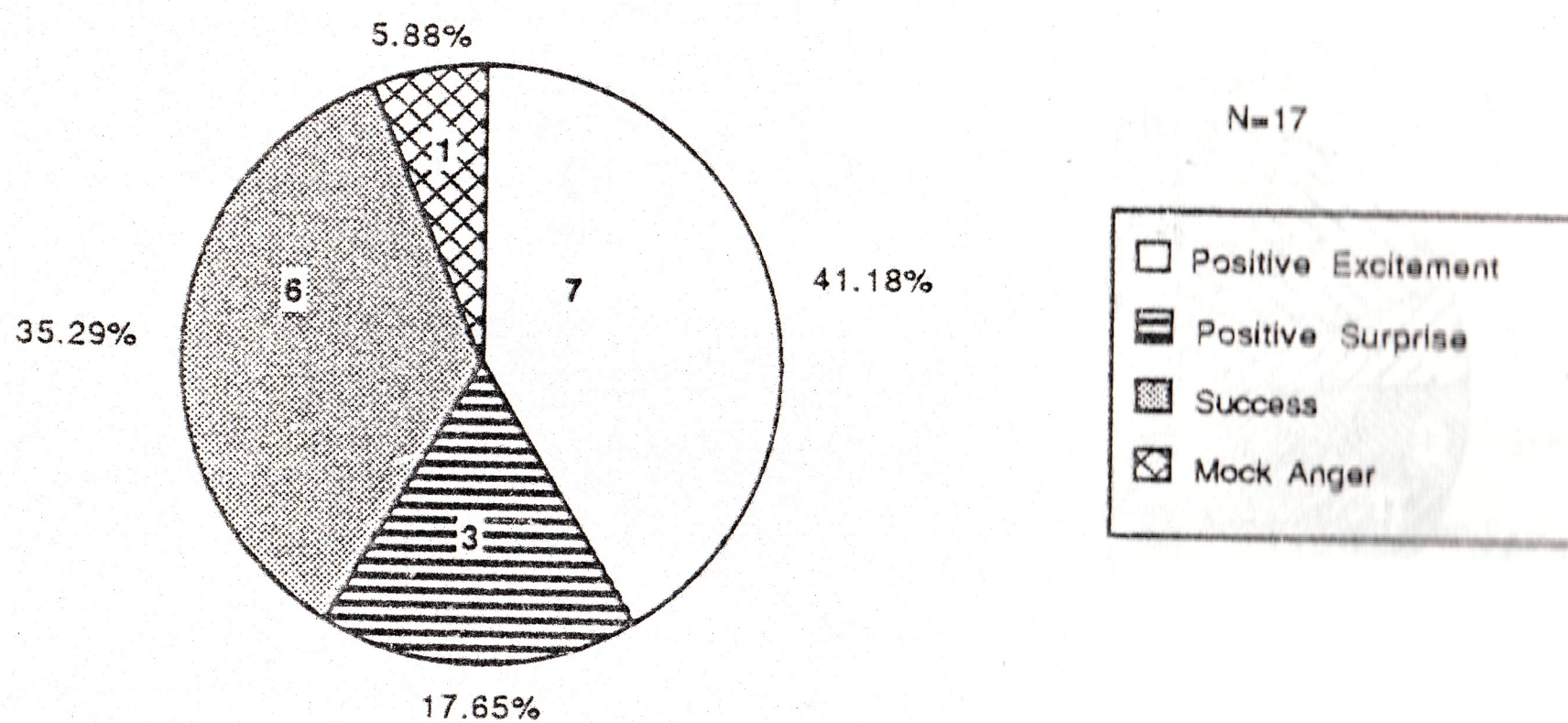
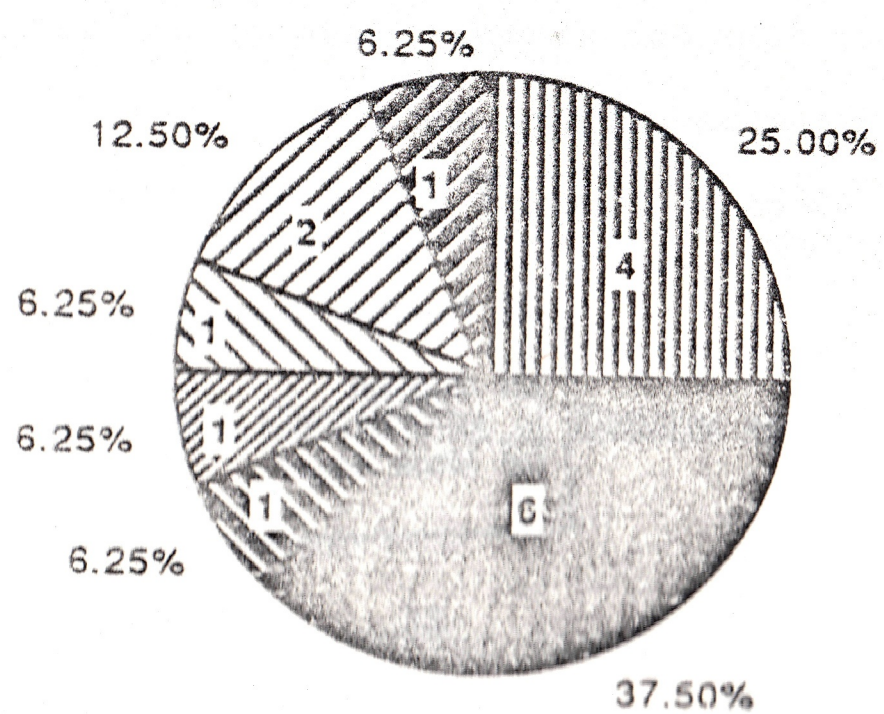


Figure 2: Graphic Distribution of Computer Related Negative Stress for Novice Respondents



N=16

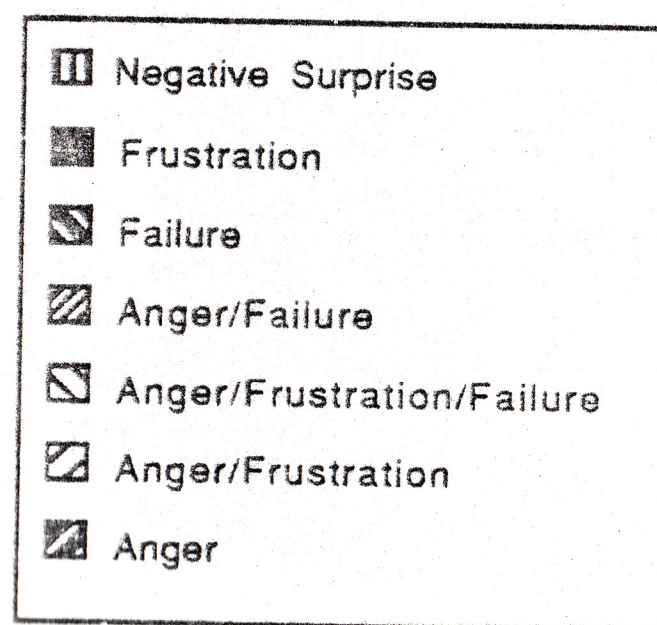


Figure 3: Graphic Distribution of Computer Related Positive and Negative Stress for Novice Respondents

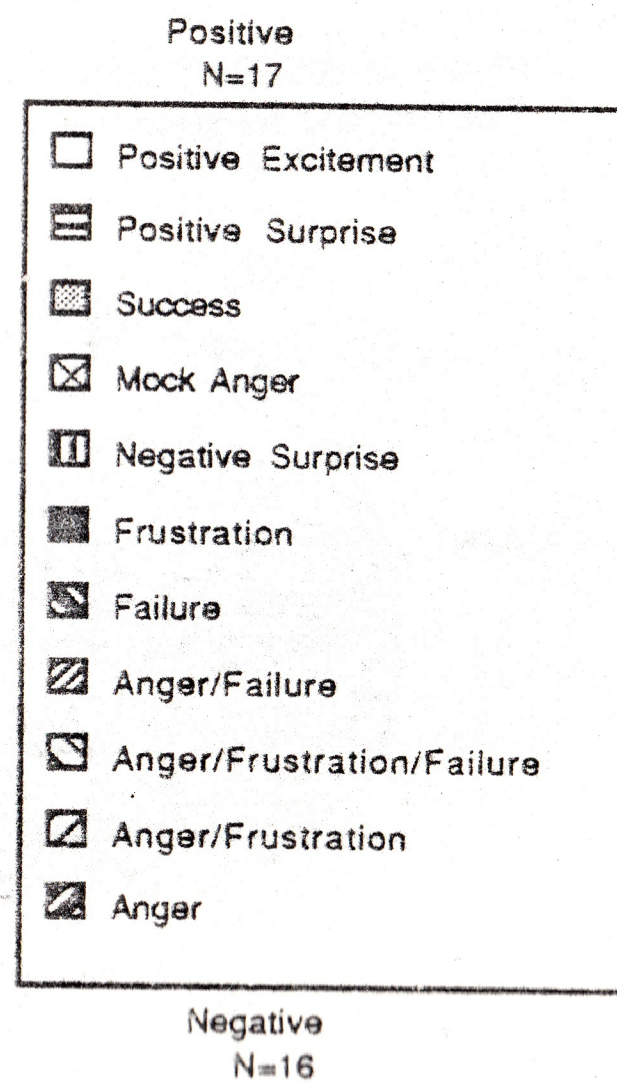
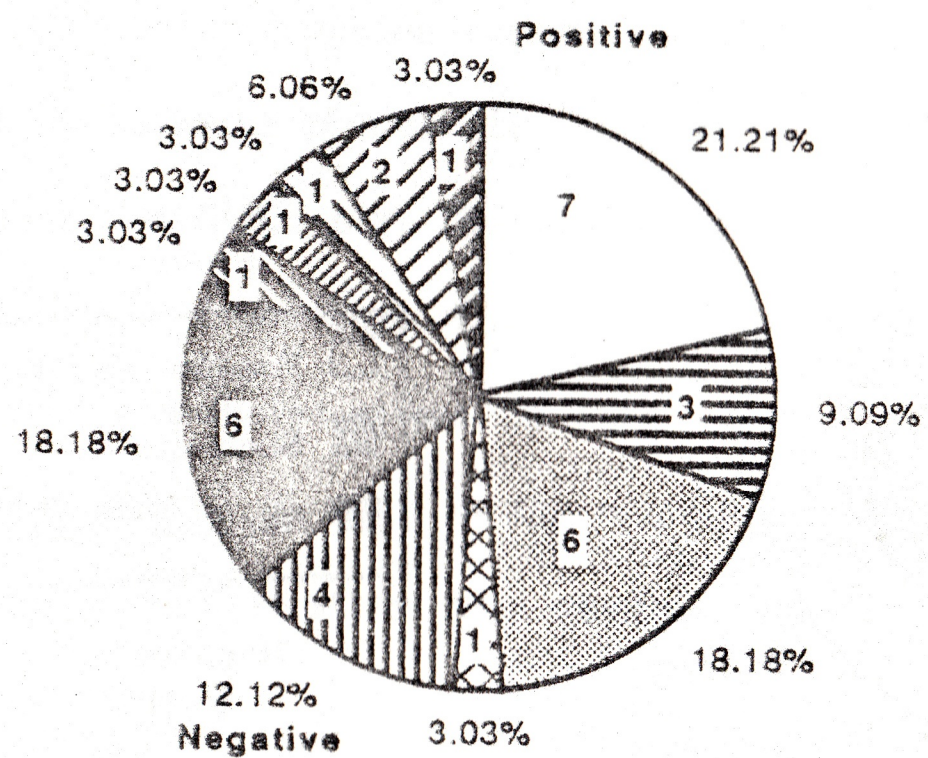
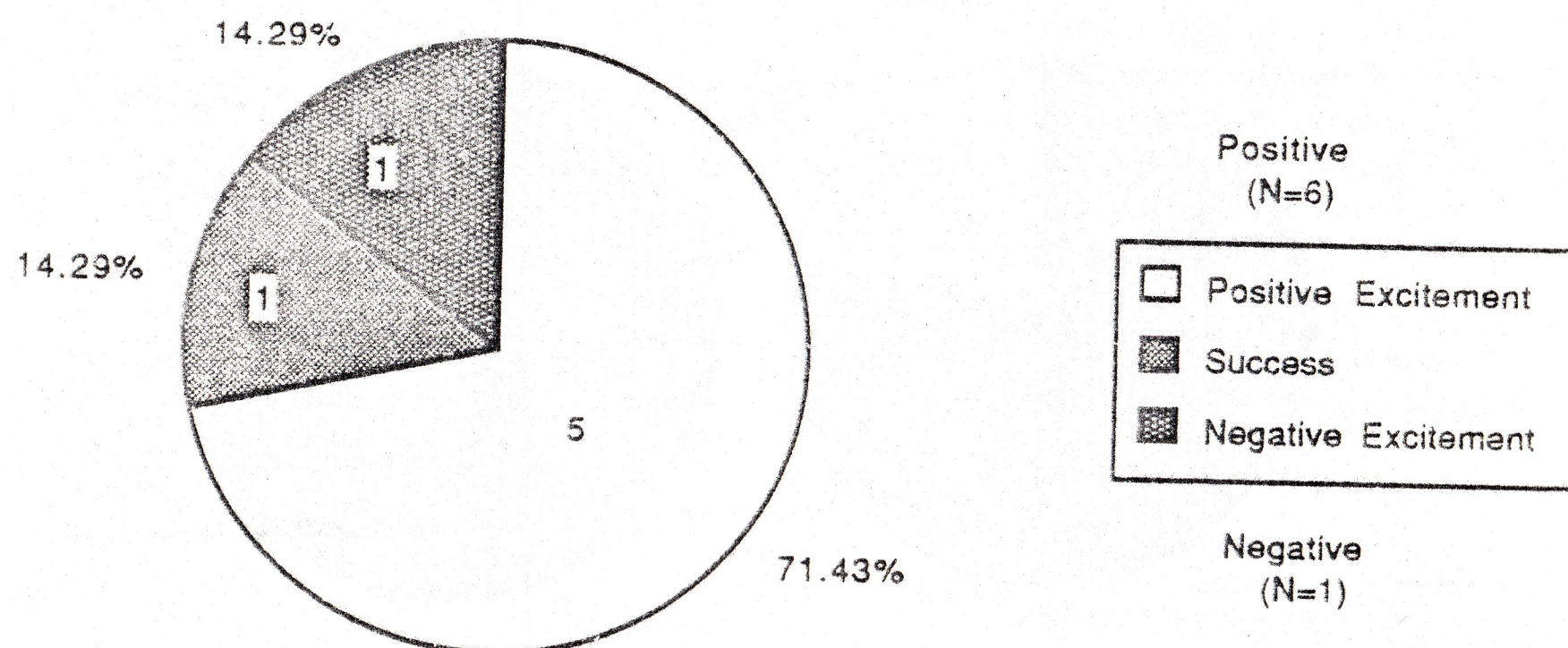


Figure 4: Graphic Distribution of Written Task Related Positive and Negative Stress for Novice Respondents



Analysis of Stress

Positive stress was more prevalent, appearing 23 times in total for both types of messages, while negative stress appeared 17 times. Negative stress was slightly more active, however, as demonstrated by the 4 cross-over instances where it was included in communication about the written task, as compared to 1 positive cross-over. Heightened computer-related stress also was found in the division of extreme stress: 13 instances of multiple exclamation points were found only in relation to computer subjects. Like the total amounts, extreme stress was divided almost evenly, with 8 occurrences of multiple exclamation points for negative stress and 5 instances for positive stress. In both types of messages all stress except for two instances related directly to the respondent and to a task. In these two cases, instances of positive stress were personal, and related both to the respondent and to the instructor.

In the positive stress attached to the use of computer and the completion of computer tasks the respondents were excited to be communicating through the computer, indicated in part by the salutations with exclamations which set an immediate and overall positive tone, somewhat thrilled by their own successes with the system, and to a lesser extent, surprised by what they were learning and experiencing about computing and electronic mail. In the written tasks their positive excitement was more general and overall as indicated by the many salutations which contained exclamations. It did not often appear to be attached specifically to any one subject.

The negative stress found in the computer related messages was more specific than the positive stress. In fact, there were no instances of general excitement which appeared frequently on the positive side. The negative stress in the computer related messages was most often frustration, in some cases combined with both anger and failure. It appeared when sending or reading electronic mail was problematic, and when repeated hard work on the other assigned computer tasks did not return expected results. Anger and frustration were combined by 1 respondent who did not think all the time the editing task took to complete correctly was really worth the trouble. Anger, frustration, and failure was evidenced by yet another respondent's repeated attempts to send electronic mail despite system and terminal problems, as well as the interference of another respondent in her session, all of which ultimately were beyond her control. Negative surprise was expressed both several days later and at the moment of the writing of the message, or real-time stress. Negative surprise was expressed when the machine did something unexpected, often when sending or reading electronic mail, or a command did not return the expected results and the operation was not completed, usually when creating a finger plan with the text editor. Outright failure and anger were among the least often expressed kinds of stress. The only instance of negative stress or anxiety relating to the written task was not connected to the actual carrying out of the project, but rather to the final delivery of the paper.⁶³

Stress was a far less active component of the communication relating to the written task, and when it appeared was weighted heavily toward positive stress. The most important negative stress which appeared in 4 written task messages related to the actual sending of that particular electronic mail message. It is interesting to

63. See below example B.2.a, p. 176.

note that although stress was higher in absolute numbers for computer related subjects rather than for written subjects, positive stress overwhelmingly characterized the respondents' communication about the written task. Thus the negative stress associated with the computer was almost completely absent and replaced by positive stress when they communicated about subjects about which they knew more or perhaps felt more secure about.

Numerically, the uneven distribution of stress between the computer tasks and the written task communication is quite clear. The reasons for this distribution may relate to the primary nature of the communication, that is, the completion of the written task. The respondents' stress was sharply focused on the tasks which they knew the least about, the computer tasks. This was particularly true in their use of electronic mail, which was the most consistent area of trouble since it was both an assigned task and the means of communication. Mentioned less often, since they were not ongoing tasks, were the finger-plan and the use of the text editor. The respondents almost exclusively expressed their problems with the computer and electronic mail in their messages about the computer tasks rather than in their written task messages, except in 4 written task messages where problems with electronic mail interfered directly with their communication.

While more stress in relation to the computer might reasonably be expected among novices than among advanced respondents, the almost even division between positive and negative stress is unexpected. This may indicate that while the novices were apprehensive about using the computer and electronic mail, given their technical problems and the non-supportive environments, they nonetheless found it an interesting, exciting, and worthwhile experience. Interview data supports this conclusion.

It is difficult to interpret clearly the more general positive excitement evidenced in some of the computer and written task messages. This stress did not relate directly to a task or specific subject. The almost even amounts of this general stress in both types of messages seems to suggest that novices were under some kind of increased stress simply because they were using the computer, or perhaps only when communicating through the computer.

The appearance of stress in these two different communicative situations, one specific and the other general, raises some interesting questions about the function of paralanguage, specifically in the area of direct versus indirect meanings. The evidence in this research is not precise enough to elucidate this aspect completely, but the overwhelming amount of stress exhibited by these novice respondents allows the area to be briefly explored.

In computer-mediated communication systems, paralanguage often is interpreted as a very deliberate form of expression. That is, the communicator deliberately, or with forethought, feels it is necessary to communicate more meaning than is present in the literal message, and paralanguage compensates in many ways for the lack of spoken and nonverbal emphasis. This situation can be seen in many cases among these novice respondents, when they wanted to tell the instructor of specific successes, failures, or problems.

But the presence of paralinguistic emphasis not attributed to any task or subject may have communicated a condition of stress or feelings about using the computer and electronic mail about which the respondent was unaware. This would be analogous to behavior in face-to-face situations, where manifestations of nervousness or anxiety in the form of body movements or voice tremor are beyond the communicator's control and are not deliberate. If paralanguage functioned for

these novice respondents in a similar fashion, then it may indicate something much more than added emphasis, or meaning above the literal message: it may indicate the sender's frame or mind or state of being. Thus the function or purpose of electronic paralanguage would be the same as that identified by Cherry (1982) and Bateson (1972b): a component of communication which is central to the communicative act, and not just a phenomenon which is a part of written language.

Yet because electronic mail communication unlike face-to-face communication is delayed and spread out over time, paralanguage as an indicator of a person's frame of mind would be harder for the recipient to notice and interpret than would be the case in the much more concentrated face-to-face situation. However, since the evidence in this research is not conclusive on this point, it also may be true that given the absence of other forms of communication that electronic paralanguage may not be enough for the sender to amply express a frame of mind, nor for the recipient to accurately interpret such a statement.

Examples of Stress

The following are examples of phrases, and when necessary, parts of the message or the entire message for the proper context, which demonstrate the characteristics of positive and negative stress. When salutations may not be obvious because the message is not printed, they are identified.⁶⁴

64. The researcher's editing to conserve space is indicated as [. . .]

A. Computer Tasks

1. Positive Excitement

- a) hELLO!!!!!!!!!!!!⁶⁵
- b) Thanks! I'll find out about those courses.

I sent email to the person who actually has this floppy disc and got a message back tonight telling me to stop by his office and pick it up! Pretty soon no more typos!

- c) This concept of being able to protect certain areas of a system to not only access but change adds considerably to my dedication to integrated online systems for libraries--to incorporate ALL the library's necessary info on to one system!!

2. Positive Surprise

- a) How id did you send a message to me while I was on line??? I tried to answer on-line, but I don't think it worked. Anyway, it was really neat! I'll figure all this out someday!
- b) Learn a little something new each day!

3. Negative Surprise

- a) How do you tell the machine to redisplay a message? I was reading your message, stopped to talk and then the message disappeared from the screen!
- b) Dear Prof. Parker--I wonder at your encouraging response to my aborted note. After I last wrote you two sentences, my mail was cut because I pressed something incorrectly. Then I wrote a follow up note and blithely sent it off.⁶⁶

Today I was told that you never got it because I addressed it incorrectly!

⁶⁵. Salutation

⁶⁶. In written task related message.

- c) I have gotten several more responses to my request for information about retrospective conversion projects, so I have been breathing a little easier.

HELP!! I don't know what the machine did—it took off on its own—it has a habit of doing that for me. Just ignore the mess, I'll continue with my message.⁶⁷

4. Success

- a) Hooray!⁶⁸ I was successful. Just as I was about to give up on the finger plan for the umpteenth time, Kate Lindsey came into the computer room and saved me.

- b) Hi!⁶⁹ I've finally done it.⁷⁰

- c) P.S. I am now located on the A terminal!!!

5. Frustration

- a) The finger plan is about to drive me crazy! I followed your instructions and I keep getting a sentence telling me that I need a switch or confirmation for a foreign host. What does that mean?
- b) It's been a bad week for me and computers. Can't seem to do anything right [. . .]

I have a print out of what I got, but, in short, I got myself into a mess that I couldn't get out of...I had no cursor, no @ sign, nothing! It was quite frightening. I had to call a consultant at White to help me out, and I did get out of it, but I still can't seem to change that info in my cmd file so I can't read the class bulletin board or make my finger plan. Any suggestions?

HELP!!!

67. This is an example of real-time stress, or stress which occurred at the precise time that the respondent lost control of this electronic mail message.

68. Salutation

69. Salutation

70. In written task related message

- c) Prof. Parker! I have been successful in creating a finger-plan however I am only able to read the plan if I do the following: @finger carr. If I type @finger carr@c it says that I have no plan. What have I done or the computer done that causes this problem?
- d) Professor Parker!!! I am trying to change my finger-plan. I have deleted it from my directory and expunged it however when I type ed finger-plan.txt I get continuing and then the deleted plan appears on the screen. What is your suggestion for my next step? Options: 1. Continue trying to write a new finger-plan or 2. Scream!!!!!!!!!!!!!!!!!!!!!!

6. Failure

- a) Professor Parker!!! I am trying to create a finger-plan on emacs and my major problem is deleting errors. According to the tutorial I should press the delete key, which I have tried but to no avail. What is your suggestion?

7. Mock-Anger

- a) Beth Fisher and I got good advice on where to go for Italian food, but could not get the machine to tell us where to go for chinese food--we tried!

8. Anger

- a) PLEASE IGNORE MY JUST PREVIOUS MESSAGE!!!⁷¹

UCC and I are going to be friends yet!

To reiterate what my previous message should have said [. . .]

9. Anger/Frustration/Failure

- a) I guess you didn't see my lastmessage about the outline. I'm having a hard time deciding where to begin. Also, another women in the class, margaret ssuzki is thinking of working on the manual with me. Up until the ge beginning of this semester, Margaret was doing the same job in preservations as I am now and was involved with RLIN in the same way I now am....(just an aside, I hate the fact that I an can't correct or edit what I type in this

71. In written task related message

machine...it makes me feel like a co moron!!
 Please excuse....) etc. etc. Any way, Margaret had the same
 problem I'm haveing , getting to know and
 understand the RLIN commands and what the different screens
 were, etc., etcc. and she agreews that a manula manual
 would beveryy useful fort for the department
 itself. (Can you read this mess?) What do you think [. . .]⁷²

- b) I had three hours of study time after my class
 tonight---time I dearly needed to keep up with my five course
 load. I came into the computer room to send Professor Garrity
 a letter on my reading for 110, and to do my finger plan for
 105. It is now two and one half hours later.
 One mm scrolled. After I aborted it and put the hard copy in
 Professor Garrity's mailbox I attempted to write and tell her it
 was there. In the middle of that communication
 someone named LS4.j-webster cut in on my program and it
 took the computer people one half hour on the phone to get
 me back to mm.

Then I innocently tried to read my bboards.
 Lee and I could not get the system to read the boards for us,
 and when we typed HELP BBOARD it took the system
 twenty minutes to print the information. it just stopped dead,
 and you couldn't get out, and just had to sit there
 and wait.

Forget starting the finger plan due in class (105) tomorrow
 night!!!

I am exhausted, and frustrated at this invasion into my precious
 time for study. And I give up on it for a few days.
 Enough is enough.

10. Anger/Frustration

- a) Your rather cryptic message about editing off the few
 "ink blots off your finger plan," sent me into hours of activity.

First, I tried to accomplish it here in the LS lab. That was a
 complete fiasco since you cannot edit here only add on.
 AND every time I touched the finger plan the protection
 setting would change to 770000 so that had to be adjusted too.

Then, finally, I went to the Library's computer nook and
 was able to eliminate the junk, get a clean finger plan
 implanted, and set the protection to 774242.

⁷². In written task related message

Was it worth it??!!

- b) Easy my foot!! as evidenced by my last message to you, cleaning that finger plan was a royal pain.

B. Written Tasks

1. Positive Excitement

- a) Thanks for all your enthusiasm. I must say, I am very excited about this project. AFWT is being very supportive as well – what a treat!
- b) Hi!⁷³
- c) Greetings!⁷⁴
- d) I'll see you next Tuesday – have a good weekend!
- e) Thanks for your time. Have a good vacation!

2. Negative Excitement

- a) Professor Parker! Did you receive my project? I put it in your box on Wednesday morning May 1 however when I went to your box to drop a self-addressed envelope on Saturday I noticed a brown envelop similar to mine still inside and I panicked.

3. Success

- a) Hi! I have finished my term project and I am somewhat pleased with the way it turned out. I used flow charts, surveys, questionnaires and other items to demonstarte certain points. I found it to be a wonderfully rich learning assignment [. . .]

73. Salutation

74. Salutation

The Paralanguage of Advanced Respondents

Unlike most of the novice respondents, the paralanguage of the advanced respondents is notable for its absence rather than its presence. As indicated in Figure E.1, the distribution of paralanguage for advanced respondents was extremely uneven, and therefore group statistics are misleading when compared to individual behavior. Of the 45 messages sent by the six advanced respondents, 31 contained paralanguage. Of these, 14 were sent by one respondent. Of the 62 paralinguistic elements contained in these messages, 43 were sent by that same respondent. This is demonstrated in Figures E.3 through E.5.

Interview data does not explain why this situation occurred, nor do the messages themselves provide hints as to why almost all of these advanced respondents sent little or no paralanguage. Perhaps since their messages were longer than those of the novices indicates that they communicated their meanings in a narrative linguistic sense rather than through paralanguage. This would be a reasonable explanation since these respondents could edit their messages to get them to the point where they communicated meaning with more precision. Yet two of these respondents did not bother to edit any of their messages, and the others did not always edit their mail.

This amount of activity is too low to allow for a more detailed analysis of their use, or non-use, of paralanguage, and this situation may be attributable to the small sample. The one respondent who was the exception to this lack of activity is worth examining, however, as shown in the following analysis.

A Profile of One Advanced Respondent

Represented as Respondent A-6 in the Key to Figures, p. 238, and as the very last advanced respondent in Figures E.1 through E.5, this was the only advanced respondent to send all of her mail, 14 messages, with paralinguage (Figure E.2). She sent more mail with paralinguage than any respondent in either group, and her messages comprised 45% of the total number of advanced messages with paralinguage. Of the 62 paralinguistic features used by the advanced respondents, she sent 43, or 69% of all the paralinguage in all message categories.

To the instructor this respondent sent poetry, one-word messages, i.e., Greetings!, and once signed her name with the tag-line of a television character. For the purposes of this research, the specific difference between this and the other advanced respondents was her use of exclamation points. Of the 13 exclamations sent by three advanced respondents, she accounted for 11 (Figure E.5). Indeed, even when compared to the exclamation-happy novices, her individual total was higher by 2 occurrences. Statistics aside, most important was that her use of exclamations was very different from the novices.

What differentiated this respondent from the other advanced respondents? They all could edit their messages, and their technical abilities in regard to the computer were about equal. Like the others, she did not have any substantial technical skills in computing and did not consider herself an advanced computer user. The most important difference was the length and context of their previous electronic mail experience. This one advanced respondent had, as a humanities undergraduate at another institution, used electronic mail and interactive talk among her peers for two years. This experience set her apart from all of the other advanced respondents, none

of whom had used electronic mail for that length of time, or that extensively in a university setting.

First introduced to the computer in a large undergraduate Basic course, Programming for Poets, this respondent, supported by friends who were computer science majors, remained on that university's mainframe system for text processing and communication. She had little or no technical expertise on that mainframe system, and did not attempt to learn any more of the system than was necessary for text processing and electronic mail. Her electronic mail, referred to at that institution as memos, and interactive talk, took place with people she saw every day, including her roommates, and casual friends whom she saw every week or less often. This communication was completely with other students and friends rather than with faculty.

She characterized this communication as casual, humorous, and "sort of pleasant" -- "just like friendly nonsense." It occurred at all hours of the day and night, often during times of considerable academic pressure, particularly when writing papers or during midterm and final examinations. As she reported in her interview, electronic mail included poems, dinner plans, and complaints about professors:

. . . we talk[ed] about what we were doing on the computer, because often you just broke into writing memos because often you were incredibly bored with what you were doing and needed a break so you would start blathering to somebody else. [A friend] was writing her senior essay, and at one point she was on the machine 12 hours a day, it was just incredible, so she sent lots of memos, just saying absolutely nothing She had a vivid imagination, so she would write messages to bunnies and bears from baby seals. . . . It was amusing.

Both mail and interactive talk eventually needed some regulation, since among this group electronic communication became slightly disruptive:

There was one famous night we were up until 5 [in the morning], and there were 3 of us, and [a friend] was writing a paper on Billie Holiday, so she started writing a take-off of Billie Holiday in memos which she would send to both Richard and I. Richard had set up one of the PF⁷⁵ keys to write "GET A GRIP" so he would send me messages saying "GET A GRIP" about 60 times. It was fun. Well we finally set up a rule we could only talk to each other every half an hour or something. It was getting ridiculous. We were talking more than we were writing. It was much more fun.

Undoubtedly, some of the content of this respondent's communication changed when she started to send electronic mail to her professor rather than to her friends. Some, rather than all, since she did send poetry and many humorous messages to the instructor, clearly a holdover from her peer undergraduate experience. Despite this dramatic change in audience then, she remained very comfortable with the medium of communication, even with a new computer system and a new electronic mail application, both of which she found more difficult than those she had used previously. This respondent developed very little technical expertise in the use of the DEC-20, but did take advantage of some of MM's more advanced features. She was apparently able to transfer a basic style of communication to this new situation and system.

Perhaps part of this transfer can be seen in her use of exclamations, which differed from other advanced respondents in quantity, and from novice respondents in purpose and function, as demonstrated in Table 5, Figure 5, and in the examples below. Unlike the novice respondents, she had no negative stress in any messages; she was not apprehensive or anxious about the computer, electronic mail, or the

75. In this case one of the PF or function keys on the IBM 3270 terminal was configured to automatically send "GET A GRIP" as an interactive message to another user.

tasks. Rather, her exclamations indicated much humor and some sarcasm, two expressions very far removed from the character of the novice communication. This was the critical difference.

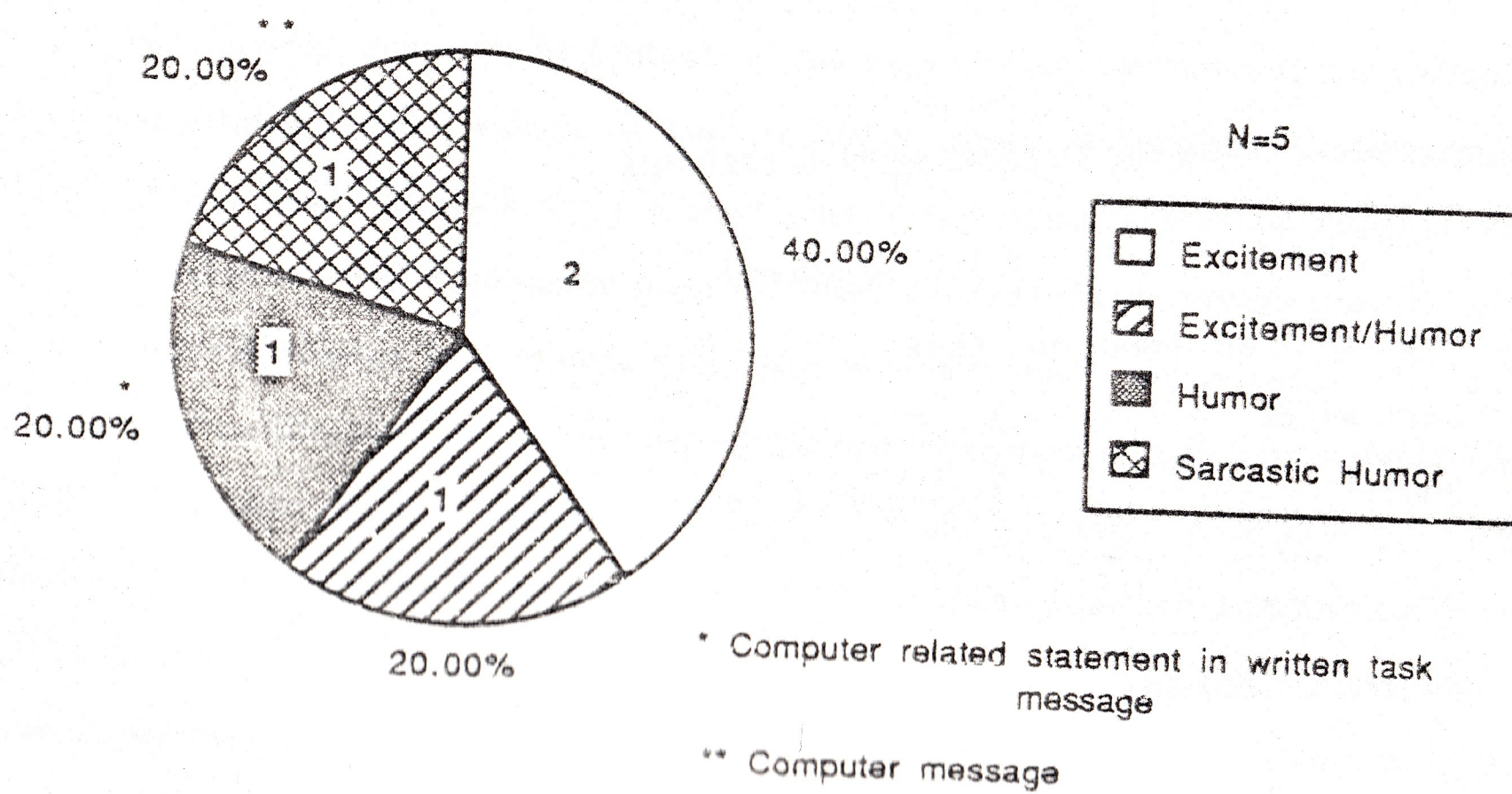
Although an entire analysis cannot be constructed from the behavior of one advanced respondent, it is clear that here exclamations showed types of stress which were quite different from the novices, and as well from other advanced respondents. Additional studies with a larger and more diverse group would help to elucidate the different functions of exclamations in the representation of stress.

Table 5

Categories of Stress for One Advanced Respondent

	Positive Stress	Total = 5
A. Written Task Messages (N=4)		
Excitement	2	
Excitement/Humor	1	
Humor	1 (computer related)	
B. Computer Task (N=1)		
Sarcastic Humor	1	

Figure 5: Graphic Distribution of Positive Stress
for One Advanced Respondent



Examples of Stress for One Advanced Respondent

1. Excitement

- a) Hello again!⁷⁶
- b) A belated hello to you!⁷⁷

2. Excitement/Humor

- a) At Ivy, on the IBM 4341, the password of cheer used to be '43 -- 41, oh boy, it's fun!'

I will have to come up with something for this.
(I am learning how to make things user-friendly.)

3. Humor

- a) Meanwhile, back at the library, my literature search continues...

Stay tuned!!⁷⁸

4. Sarcastic Humor

- a) How terribly exciting! Editing makes the heart grow fonder.

I suppose now I really will have to learn SCRIBE.
But then, I never really was fond of loose time on my week-ends.

Text Forms

Several different types of text arrangements were identified, including a lack of spacing between the salutation and the body of the text, term paper outlines, short line lengths, no lines between paragraphs, bibliographies, numbered lists and

76. Salutation

77. Salutation

78. Closing

poetry.⁷⁹ The term paper outlines, bibliographies, and numbered lists were very formal messages concerned directly with the written and computer tasks.

The differences by rank in the Text Forms category, while not as dramatic as the use of exclamations, does seem to indicate that novices much more often than advanced respondents, 17 occurrences to 5, respectively, sent messages which had no line or lines between the salutation and the body of the text.⁸⁰ This may be another indicator of stress if it signifies a quickness in communication or composition on the part of the respondent. While this difference in one feature by rank may be important, it would appear that the use of various text forms is interesting more in a general way, in the variety of forms which appear, rather than for its distribution by rank.

Combinations of Paralinguistic Elements

In all message categories, novice respondents sent 11 combinations of paralinguistic elements, while advanced respondents sent 5. All of these combinations were grammatical markers. Combinations of paralanguage were coded according to the criteria presented on p. 58.

There were not enough combinations of paralinguistic elements by either group to provide evidence for analysis by rank, but it is interesting to note that in the novice messages, 4 combinations began with ellipses, although 3 of these were sent by one respondent. In these combinations, ellipses were followed by a variety of

79. As listed in Table 1, 6.a-6.g, p. 151.

80. For examples, see above, p. 173, 4.a, 4.b, and 5.c.

other features, including capitals and exclamations, as evidenced in these two examples, both of which applied to the computer or the computer tasks:

- a) In any event it is done.....I hope!!!
- b) And, if I could somehow cure my fear of computers at the same time...that would BE ideal. Is this possible?

If ellipses indicate pause, it is possible that using them before features which indicate stress might provide even more stress or accent to the final thought by slowing down the pace of the first part of the communication.

Instructor Mail

The instructor sent most of her mail without paralanguage. Of the 120 messages to the respondents, 51 or 42.5% contained paralanguage, while 69 or 57.5% contained no paralanguage. This division is opposite of the respondent mail, where most messages contained paralanguage. A total of 33 instructor-to-novice messages with paralanguage were sent in the computer (18) and written (15) categories, somewhat less than the corresponding number of messages with paralanguage which were sent by the novices. A total of 18 instructor-to-advanced messages were slightly more distributed among the various categories, including computer (3), written (9), personal (5) and other (1), which were also somewhat less than the corresponding number of messages with paralanguage which were sent by the advanced respondents.

Although the instructor sent fewer of her messages with paralinguistic features, she sent approximately the same amount of paralinguistic features to each group in proportion to the number of messages which they sent to her. There were only slight variations in the numbers and types of each feature sent to the two groups, as indicated below in Table 6, p. 187. The instructor sent a total of 63 paralinguistic features in all messages, 39 in novice messages and 24 in advanced.

The most frequently used paralinguistic features sent by the instructor were exclamation points (28), capitals (10), and quotations (10). As in the respondent messages, positive stress predominated through exclamations and capitals. The only interesting difference between the paralinguistic features sent to each group was the appearance of 3 text forms in the novice messages which were technical/instructional lists of how to set protection on finger-plans. These messages matched those from the respondents which asked for information on this technical point. There were no such instructional messages to advanced respondents.

It should be noted that the instructor, because of her considerable experience with electronic mail and her wide-ranging electronic correspondence with many different kinds of computer users over the years, was aware of the variety and more elaborate types of paralinguistic features used in computer-mediated communication systems. She decided not to introduce new features to the respondents, however, but to use those which they had sent to her.

Table 6

Distribution of Instructor Paralanguage

<u>Category/Feature</u>	<u>Rank/Appearance</u>		
	Novice	Advanced	Total
1. Vocal Spellings	0	0	0
2. Lexical Surrogates/ Vocal Segregates	0	0	0
3. Manipulation of Grammatical Markers	33	21	54
a. Capitals/Uppercasing	5	5	10
b. Ellipses	3	1	4
c. Exclamation Point(s)	16	12	28
d. Parentheses	1	0	1
e. Question Mark	0	0	0
f. Question Marks	1	0	1
g. Quotation Marks	7	3	10
h. Square Brackets	0	0	0
4. Manipulation of Of Special Symbols	2	1	3
5. Spatial Arrays	0	0	0
6. Text Forms	4	2	6
a. List/Bibliography	1	0	1
b. List/Misc./Numbered	0	1	1
c. List/Technical Inst.	3	0	3
d. Poetry	0	1	1
7. Text Movement	0	0	0
Total:	Novice: 39	Advanced: 24	63

Chapter VIII

Conclusions

This case study has explored many issues relating to paralanguage in electronic mail. Its specific focus was to understand the differences and similarities in the use of paralanguage according to the levels of electronic mail and computing experience and technical expertise of 16 respondents in a particular situation. Its more general focus was to explore paralanguage in electronic mail and in other types of communication. To answer the questions about paralanguage and experience, to understand its functions within this universe, as well as to address some of the larger issues about paralanguage in computer-mediated communication, this research cast the net very widely to include many factors which were a part of the communications context.

In this case study, analyses of the respondents' cultural, physical and technical environments were constructed using an ethnographic approach; ideas of rank and technical expertise in regard to the changes in the user community were reevaluated; the relational communications context of the computerized complementary dyad was explored; precise coding narratives were developed for the identification of paralinguistic features, and finally, this study provided a conceptual framework for the analysis of paralanguage in computer-mediated communication built on previous work in this and other media. All of this made possible a definition for the phenomenon in computer-mediated communication with a new, formal term: electronic paralanguage.

These contexts revealed a portrait of the use of paralinguistic which in some but not all cases showed substantial differences by the rank of the respondent, as well as differences in individual behaviors. These contexts also revealed that paralinguistic can provide a robust picture of the character of communication in which it appears. Novice respondents used more paralinguistic in more types of messages than did advanced respondents, whose paralinguistic was notable for its uneven distributions and for the most part, its complete absence, except for one respondent. For these respondents, then, paralinguistic can be considered one attribute of communication which in certain cases differs by rank. Taking into account the behavior of one advanced respondent, which provided another interpretive context, it also was demonstrated that the relationship between paralinguistic and rank can be evidenced by differences in the phenomenon's specific characteristics.

In the case of computer task related messages, the differences between the use of paralinguistic by these two ranks of respondents was striking. Because it was so dramatic, microanalyses of the role and function of one paralinguistic feature used by novice respondents, that of exclamation points, was possible. Thus it was revealed that paralinguistic can in certain cases be a general measure of stress and experience, and as well a precise indicator of different kinds of psychological stress. Further, this stress could be attributed to the type of communication, and was weighted heavily toward those messages which concerned the computer tasks or the use of the computer.

Methodologically, the group and individual usage patterns uncovered through these various contexts permitted multiple levels of exploration and interpretation. First, the use of exclamation points by novice rather than by advanced respondents

showed that this paralinguistic feature can be related to rank. Second, within the novice rank the use of exclamation points was identified in the communication about the computer and written tasks. Third, after both rank and type of communication relationships were made, the number of exclamation points was counted according to the type of communication in which they appeared and the exact subjects to which they related. Fourth, psychological stress, represented by exclamation points, was specifically characterized by the subjects to which it was applied and the contexts in which it appeared. Fifth, this stress was interpreted as a more general phenomenon not related to any specific subject or task. Finally, when novice stress was taken out of that context and compared to one advanced respondent, it was revealed that the stress expressed in the latter case was far different than in the former.

Through these various levels of exploration it was demonstrated that the stress of novice respondents in these messages was almost evenly divided between positive and negative stress instead of being predominantly negative, as would have been expected because of their inexperience with the medium and their many problems with the computing environments. These specific positive and negative divisions, along with the presence of general stress, presented a complex picture of the respondents' communication which moved beyond interpreting paralanguage as a means of deliberate expression to interpreting paralanguage as a less conscious indicator of frame of mind. Although the results of this particular line of inquiry were not definitive, the evidence did suggest that like its spoken and written predecessors, electronic paralanguage may be a component of communication which is central to this medium.

Because individual differences were prominent at some points, a comparison of novice paralanguage with one advanced respondent's use also was possible. This

revealed a broader picture of the role of paralanguage by experience, although a complete comparison was not possible from only one respondent. The stress of this one advanced respondent was always positive, humorous and sarcastic, unburdened and lighthearted, unlike the heavier stress of the novices. What differentiated this one advanced respondent from the others in her group and as well as from the novices was her extensive previous electronic mail experience. What was particularly interesting about this respondent's background was that she had little or no technical expertise with computing, nor did she gain any with this particular electronic mail system or computer.

There was no apparent explanation for the lack of paralanguage among advanced respondents. Perhaps the longer length of their messages indicated that they expressed their meanings in narrative prose rather than through paralanguage. The number of advanced respondents in this research was too small to draw any definitive conclusions, since this lack of activity may be attributable to idiosyncratic differences. A study which had a larger number respondents of the same type may uncover more distinct patterns or use, or more precise reasons for the lack of use.

The complementary relationship was shown to have had an impact on the types of paralanguage which appeared. Although no corresponding set of peer group messages was available for analysis, in their interviews the respondents offered both general and specific observations about the differences between electronic mail sent to the instructor and that sent to friends. It was also demonstrated that audience awareness among this group was very high, and could be in part attributed to the complementary nature of the relationship as well as to the non-elective and task-related aspects of this situation. Further, it was revealed that both the media and relational components of the computerized complementary dyad brought about more

liberal forms of negative expression, as well as more personal kinds of information exchange, than would be true in face-to-face interaction. While both of these types of expression remained within the boundaries of the relationship, a few respondents were somewhat uncomfortable with the latter.

By taking into account earlier research on paralinguage in computer-mediated communication and in other forms, as well as the characteristics of paper-based written and electronic media, paralinguage in electronic mail and other systems was shown to have enough distinct features to be organized into three separate areas: alphabetic, symbolic, and spatial. Within these areas, major categories were expanded from John Carey's earlier research to include seven different types of paralinguage. Some of the individual paralinguistic elements within these categories were shown to have originated from print and electronic mass media, while others were demonstrated as unique, at least in their use, to electronic mail and other computer-mediated communication systems.

This theoretical analysis of paralinguage in electronic mail, by delineating separate general areas, detailed major categories, individual elements, and many different kinds of uses, allowed specific conclusions to be drawn about the characteristics of this type of paralinguage. While at times reminiscent of spoken and written paralinguage, it often is positioned somewhere between the two. Hence, it has its own set of properties, a formal definition, and its own name, electronic paralinguage. Perhaps future studies of electronic paralinguage in other computer-mediated systems, particularly bulletin boards and computer conferencing, will help to show if there should be even further distinctions made to this theory and this term according to the specific style of communication.

The theory used here to interpret electronic paralinguage, combined with the evidence provided by these respondents, revealed quite clearly the existence of two types of paralinguistic codes. Indeed, it could be argued that one of these codes could easily have been noticed without any substantial work in this area. The major paralinguistic code for all users⁸¹ of computer-mediated communication systems is based on one code which has transferred from written and printed language, that is, standard American English punctuation: a system of standardized marks that is a "set of unambiguous rules, whereby messages are converted from one representation to another." Under the larger heading of symbolic paralinguage it includes grammatical markers, and to a lesser extent, certain special symbols. These ellipses, question marks and exclamation points, among others, provide several forms of emphasis which have been recognized in modern punctuation since the turn of the century.

A second paralinguistic code also transferred from written and print culture. This code includes certain text forms classified as spatial paralinguage. Numbered lists, outlines, and right-justified text, often used to show formality, communicate the same meaning in writing and print as they do in electronic mail.

For these novice respondents, however, the code which they expressed most often was based on standard punctuation. They could have communicated effectively with any other electronic mail user with any level of experience or technical expertise, and just as easily, any other user employing that same code could have made themselves understood to the novices. Perhaps this code has been overlooked by scholars because they wanted to find an advanced paralinguistic code, one unique to this medium which might be present among those whose experience with

⁸¹. That is, for all those who speak American English.

computing was far greater than novices. No such unique or advanced code has been found herein among either group.

This study has also drawn attention to the fact that the idea of ranking electronic mail users is a slippery one. Where once technical expertise was among the most important criteria, the widespread use of computer-mediated communication systems has neutralized this factor and made experience with the medium an important variable. The identification of a paralinguistic code shared by electronic mail users, that which is based on standard American English punctuation, further demonstrates the similarities between traditional written and electronic communication, and also diminishes the importance of technical expertise in computer-mediated communication. The task before scholars now is to determine what role technical expertise and experience play in the communication process, and to create a typology of electronic mail users.

Perhaps categories such as novice, intermediate or advanced, as well as the more general classifications of occasional or frequent, are too rigid for such a wide and diverse user community. For those who communicate through the computer, when compared to those who use a system solely for programming, the idea of rank is not as clear-cut because of the many different kinds of activities which occur.

What makes any typology of electronic mail users difficult is that it must ultimately be constructed within the context of communications ability. The ability to communicate includes two very different factors: experience and technical control of message appearance, or text editing. Evaluating a person's ability to communicate through ideas which come from such terms as "novice" and "advanced" may be misleading if not incorrect. Why should these rigid and technically oriented classifications be applied to communications ability or effectiveness? In other

situations, including face-to-face interaction, telephone conversations, letter writing and mass-mediated communication, we do not rank the ability to communicate as novice, intermediate or advanced. We do not call someone a "novice" or "advanced" "communicator." We do, however, measure them as good or poor, mediocre or excellent, speakers and writers. In an earlier time there were silver-tongued orators; now there are less romantic great communicators. Regardless of what we call people and how we measure their speaking and writing abilities, it is rarely, if ever, as novice and advanced.

While paralanguage can offer a robust and sometimes precise picture of communication, as an indicator it only extends so far. It is not a total measure of communication, and it is not presented in this research as such: it is only one component of the entire process of communication. Ideally, it should be considered along with other indicators, such as demographic measures and specific characteristics of the channel, particularly interactivity. And as this study has demonstrated, when paralanguage is absent, as it was with the advanced respondents, there is little context for interpretation. We do not yet know enough about how to interpret the *presence* of paralanguage in order to provide an interpretive frame of reference to understand what its *absence* indicates. Thus while in some situations the reasons for the use and non-use of paralanguage by these respondents was clear, in other situations it was not, and explanations must be found elsewhere.

Also, because of the small size of this sample, the conclusions in this study about experience and paralanguage are not directly applicable to similar situations. Nor can these results be applied to those with very different levels of experience and expertise. Additional small studies of the same types of users, as well as very large

samples, would determine if these respondents' behavior was highly idiosyncratic or indicative of a larger population. Specifically, other studies of complementary communication in a business environment would reveal if the kinds of behaviors found here were unique to the academic complementary relationship, or extend more fully to the complementary relationship in other environments. Similarly, analyses of peer communication would help to identify not only more types of paralanguage, but its function in relational communication.

In addition, the results of this research might have been quite different if the environments were changed. Perhaps those working in environments which encouraged computer use as well as learning about computing, or had access to facilities from their home, would have changed some of these respondents' negative attitudes or otherwise accounted for technical differences in the use of paralanguage. For these respondents it was quite apparent that if the computer system and specifically, the text editor, would have been easier to learn and use, overall electronic mail usage and paralanguage would have been different than what occurred.

Many areas of this research can be used by other scholars working in computer-mediated communication studies. If nothing else, this case study has defined a precise term, electronic paralanguage, which can now be used to properly identify these elements. Both quantitative and qualitative studies can use electronic paralanguage as one indicator of the character of communication, or show that in other cases it does not function as such. If set in context, the major categories of paralanguage and their specific elements can provide interpretive structures for many different kinds of analyses.

The experiences of these respondents also have implications for the technical design of electronic mail systems. Communication is influenced by whether a person can or cannot edit a message. Electronic mail and other systems in all environments should be made as easy to use as possible.

Finally, as the use of computer-mediated communication systems continues to grow, at issue is our ability to understand communication by analyzing the original electronic or computer-generated printed transcript. This type of analysis is very new when compared to interpretations of the more traditional written and printed records, as well as the relatively new audio and video records; but paralanguage in all of these media is an important component of communication. Recently, Lt. Colonel Oliver North, Vice Admiral John Poindexter, and Robert McFarlane used a National Security Agency electronic mail system. The transcript which survives comprises the most complete and detailed body of evidence about the Iran-Contra arms scandal, and was published in part in the Tower Commission Report. Like the Watergate tapes, or any letter or document, private or published, these electronic mail transcripts are another means of understanding who, said what, to whom, and with what effect, through a very new medium of communication.⁸²

82. With apologies to Harold Lasswell.

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Appendix A

Technical Note: Representing Electronic Communication

Many problems arise when representing one form of communication in or through another, particularly when those forms are radically different, i.e., stagnant print and interactive electronic mail computer text. In addition, the coding procedures used in this research did result in major changes of the physical layout of the text, but the original, uncoded messages were kept for analysis and used when necessary.

Absolutely no attempt has been made to change the content of these messages by editing them for style. All "typographical" errors and spelling mistakes have been preserved.

Of direct concern here, however, is that for purposes of analysis and example the form of the electronic mail message was preserved as closely as possible to the original. In those cases where it could not be, every attempt was made to adequately describe the original condition of the message if it was known.

Messages which did not contain carriage returns or line breaks cannot be represented reasonably in print without running off the page entirely at the right margin. Even then, the true effect of this condition on the screen is lost on paper. During data collection this researcher became suspicious of the high number of messages which did not contain carriage returns. After examination of the original copy, discussion with the instructor, and various tests of the mail system it was found that MM, when the message was forwarded from the instructor to this

researcher, could change the format of the mail message by eliminating carriage returns. Therefore when sent originally to the instructor, most messages did contain reasonable line breaks. Consultation with the technical staff member who supported MM was helpful, but failed to identify why and when this problem occurred, but it was clear that MM could and often did change the format of the message at some point in the forwarding procedure. For these reasons almost all messages which appeared without carriage returns were immediately reformatted to include them, unless the content of the messages indicated that there were no carriage returns or other problems with line endings.

Those cases in which the respondent did not leave spaces between salutations and text, between paragraphs, or between sentences and words have as much as possible been maintained during coding. They are represented here as close to the original as possible. Non-standard text formats, i.e., text entered only half way across the screen, have also been represented here as accurately as possible.

Appendix B
Questionnaires and QUERY Files

Part I: Background Questionnaire

A. General Information

Date: _____

Name: _____

Address: _____

Telep. # _____

Class: ☐ 105 ☐ 106 ☐ other _____

Age: ☐ 20-30 ☐ 31-40 ☐ 41-50 ☐ over 50

Sex: ☐ Male ☐ Female

Student Status: ☐ part-time ☐ full-time
 ☐ M.S. candidate ☐ DLS candidate ☐ Certificate
 ☐ Special Student ☐ other _____

Amount of time in this program (approximately): _____

Degrees earned:	☐ B.A.	in	_____
(please indicate	☐ B.S.	in	_____
field)	☐ M.A.	in	_____
	☐ M.S.	in	_____
	☐ MLS		_____
	☐ DLS		_____
	☐ PhD	in	_____
	☐ other		_____

Occupation: ☐ student
 ☐ other (please indicate title and type of company)

B. Computing Background (Occupational)

1. Do you presently use computers at work?

- ☐ yes (infrequently) (please indicate for what purpose below)
☐ yes (frequently) (please indicate for what purpose below)
☐ no
-
-

2. What kind of computer system(s) do you use?
(e.g. microcomputer, mainframe, bibliographic service, IBM, DEC, etc.)

3. How would you rank your experiences with computers at your current job?
(1 = unfavorable 10 = very favorable)

1 2 3 4 5 6 7 8 9 10

4. Did you use computers at previous jobs?

- ☐ yes (infrequently) (briefly indicate for what purpose below)
☐ yes (frequently) (briefly indicate for what purpose below)
☐ no
-
-

5. What kind of computer system(s) did you use at your previous jobs?
(e.g. microcomputer, mainframe, bibliographic service, IBM, DEC, etc.)

6. How would you rank your experiences with computers at your previous job?
(1 = unfavorable 10 = very favorable)

1 2 3 4 5 6 7 8 9 10

C. Computing Background (Educational)

7. Is this the first time you used computers in school?

- ☐ yes (skip to question 11.)
☐ no

8. If no, when did you first use computers in school?

- ☐ High School ☐ College ☐ Graduate School ☐ other _____

9. What kind of computer system(s) did you use in school prior to this?
(e.g. microcomputer, mainframe, bibliographic service, IBM, DEC, etc.)

10. How would you rank your experiences with computers in school prior to this?
(1 = unfavorable 10 = very favorable)

1 2 3 4 5 6 7 8 9 10

11. What are you now using computer for in school?
(e.g. text processing, statistics, information retrieval, mail)

12. What computer systems are you currently using?

D. Computing Background (Personal)

13. Do you own a personal computer or terminal at home?

☐ yes ☐ personal computer ☐ terminal ☐ other _____
☐ no

14. If yes, what kind (IBM PC, Kaypro, Atari, etc.)

15. Do you own a telephone modem?

☐ yes
☐ no

16. Generally, what do you use your personal computer or terminal for?

17. Do you plan to buy a personal computer or terminal?

☐ yes
☐ no

18. General comments about computers:

E. Communications Background

The following questions apply to your U.S. postal paper mail/ correspondence not related to your job.

19. What percentage of your mail sent to your home is: (approximately)

personal _____% (letters and cards from friends and relatives, etc.)
business _____% (bills and other mail addressed specifically to you)
magazines, periodicals, etc. _____%
advertisements _____% (unsolicited)
other unsolicited mail _____%

20. How many personal letters (to friends and relatives) do you write per month? (approximately)

21. What percentage of these personal letters are to: (approximately)

[] family _____%
[] friends _____%
[] other _____%

22. How many personal letters (from friends and relatives) do you receive per month? (approximately)

23. What percentage of these personal letters are from: (approximately)

[] family _____%
[] friends _____%
[] other _____%

24. How often do you substitute a long-distance telephone call for a reply to a personal letter?

[] always [] often [] sometimes [] never

25. If you substitute a telephone call for a reply to a letter, how does the correspondence then resume?

- ☐ I eventually answer the letter after the telephone call
☐ the other person sends me another letter
☐ other _____

26. Do you prefer to make long-distance telephone calls instead of writing letters?

- ☐ always ☐ often ☐ sometimes ☐ never

27. General comments about postal mail, letters, etc.

Part II: Electronic Mail Use and Opinions

2/19/85-2/20/85

Name: _____ [] 105 [] 106

1. Have you ever used electronic mail prior to this class?
- [] yes (infrequently) (please indicate where and when below)
[] yes (frequently) (please indicate where and when below)
[] no
-
2. Have you ever used any other computer-mediated communication systems prior to this class, i.e., bulletin boards, computer conferencing interactive talk?
- [] yes (infrequently) (please indicate where and when below)
[] yes (frequently) (please indicate where and when below)
[] no
-
3. Have you ever used UCC's electronic mail system prior to this class?
- [] yes (infrequently)
[] yes (frequently)
[] no
4. Was your previous use of the mail system for: (check all that apply)
- [] class use (required)
[] class use (elective)
[] personal use
[] independent research
[] other _____

5. So far, how would you rate your experience with electronic mail in this class? (1 = unfavorable 10 = very favorable)

1 2 3 4 5 6 7 8 9 10

6. How many messages have you sent this semester (approximately)

☐ 1-5 ☐ 6-10 ☐ 11-20 ☐ 21-30 ☐ _____

7. How many messages have you received this semester (approximately)

☐ 1-5 ☐ 6-10 ☐ 11-20 ☐ 21-30 ☐ _____

8. In this class what percentage of your messages were (approximately)

to the instructor _____%
 to other students in the class _____%
 to other instructors _____%
 to friends _____%
 other people you do not know _____%
 UCC staff members _____%

9. Generally, how often did these people reply to your messages:

	ALWAYS	SOMETIMES	NEVER
instructor	☐	☐	☐
other students in the class	☐	☐	☐
other instructors	☐	☐	☐
friends	☐	☐	☐
other people you do not know	☐	☐	☐
CUCCA staff members	☐	☐	☐

10. In this class, electronic mail was most appropriate for:
 (rank in descending order 10 = most appropriate, 1 = least appropriate,
 NA = not applicable)

USE	RANK
decision-making	_____
exchanging information	_____
resolving disagreements	_____
staying in touch	_____
generating ideas	_____
exchanging confidential information	_____
asking questions	_____
exchanging opinions	_____
getting to know someone	_____
bargaining/negotiating	_____

11. Did the use of electronic mail to contact the instructor:
- ☐ significantly decrease your office hour visits
☐ marginally decrease your office hour visits
☐ I rarely take advantage of office hours
- ☐ significantly decrease telephone calls to the instructor
☐ marginally decrease telephone calls to the instructor
☐ I rarely telephone my instructor
12. Were you satisfied with the instructor's replies to your messages?
- ☐ very satisfied ☐ somewhat satisfied ☐ unsatisfied
13. What other methods did you use to contact the instructor:
- ☐ office hours
☐ telephone calls
☐ casual meetings during scheduled class hours
14. Did you find the electronic mail system:
- ☐ easy to learn and use
☐ hard to learn and use
☐ hard to learn but eventually comfortable with it
☐ very hard to learn and use
☐ other _____

15. Are you able to correct errors in the message or make changes through editing?
- ☐ yes ☐ no
16. Did you use any of the mail systems special features, such as:
(check all that apply)
- ☐ reply-to-sender function
 - ☐ carbon copy (cc)
 - ☐ blind carbon copy (bcc)
 - ☐ forwarding a message to another user
 - ☐ remailing a message to another user
 - ☐ copying a message into your directory
 - ☐ deleting a message
 - ☐ expunging a message
 - ☐ flagging a message
 - ☐ keywords
 - ☐ help facility
 - ☐ other _____
17. Do you read the system bulletin board?
- ☐ yes ☐ no
18. Did you ever send top-level mail (mail to the entire class)?
- ☐ yes ☐ no
19. Did you ever use the interactive talk or send facility?
- ☐ yes ☐ no
20. Would you like to continue your use of electronic mail after you leave this class?
- ☐ yes ☐ no
21. General comments:
-
-

Consent Form

The purpose of this study is to examine attitudes about and uses of computer-mediated communication systems, particularly electronic mail and related communications media.

As an informant in this study you are providing evidence in the following forms:

1. completed written questionnaires;
2. electronic mail messages which will be read online and printed out for further analysis;
3. tape-recorded interviews, and
4. on-site observation of computer sessions

Anonymity is guaranteed at every point in this study relating to the forms of evidence detailed above. Anonymity will be applied to both you and to the school you are currently attending. In this study you will be assigned a pseudonym for your written and oral responses to questions, your electronic mail messages, and observations made during on-site sessions. The school will be identified as a large urban university offering library science instruction.

Collected data will be considered confidential and will not be released to any other person, institution or agency now or in the future.

The evidence you provide as detailed above will be used in this study in the form of interpretation and direct quotation.

Since you and the institution will never be identified, this study presents no personal or professional risks to you or the institution.

You can expect no direct benefit from this study, except reading it upon completion for your own intellectual benefit or curiosity.

You are free to withdraw your consent and/or discontinue participation at any time. You have the right to express your concerns and complaints to the Institutional Review Committee. You are encouraged to ask the interviewer any questions about this study and the use of the data.

Subject's Name (print) _____

Subject's Signature _____

Investigator's Name _____

Investigator's Signature _____

Date: _____

QUERY FilesRaw Data Files

^Stu Rep Adv

^Giv Writ Tas Rel Inf

^Pre Ann Mail

Mail-From: LS4.M-RAINER created at 6-Feb-85 10:00:46

|Date: Wed 6 Feb 85 10:00:46-EST

^From: Marsha Rainer <LS4.M-RAINER@GU20A>

\Subject: 2nd correspondence re paper

+To: ls5.j-parker@GU20A

%cc: LS4.M-RAINER@GU20A

{salutation/Prof. Parker:/colon}

[Prof. Parker:]

Thank you for your assistance. I will keep you informed of my progress.

{parens and exclamation}

[The following is a rough (very!) outline for my paper.]

{text form/outline}

- [I. A brief history of OPAC's in Public Libraries.
- II. Identification of select OPAC's in various Public Libraries.
- III. Description the subject search features and the record structures which support them.]
- IV. Comparative analysis of the selected systems by features and record structures
- V. Ranking of the features based on user cordiality and/or system efficiency (recall, precision).

^Ins Rep Adv

^Giv Writ Tas Rel Inf

^Pre Ann Mail

6-Feb-85 22:43:54-EST.673;0000000000001
 Mail-From: LS5.J-PARKER created at 6-Feb-85 22:43:52
 |Date: Wed 6 Feb 85 22:43:52-EST
 ^From: Joan Parker <LS5.J-PARKER@GU20A>
 \Subject: Re: 2nd correspondence re paper
 +To: LS4.M-RAINER@GU20A
 %In-Reply-To: Message from "Marsha Rainer <LS4.M-RAINER@GU20A>"
 of Wed 6 Feb 85 10:00:47-EST

{salutation/dear marsha,/comma}

[dear marsha.]

{exclamation}

[your project outline is excellent. i'm sure you will find plenty
 of literature, & if you can find one or two (or more) case studies, ex-
 amples of the systems you will find described in the literature, it will
 be even more interesting and useful.]

[This is a great start! Now do some searching in the
 literature.]

{closing/see you next week}

[see you next week.]

{signature}

[/prof. parker]

Processed Data Files

STU REP ADV

GIV WRIT TAS REL INF

PRE ANN MAIL

Date: Wed 6 Feb 85 10:00:46-EST
From: Marsha Rainer <LS4.M-RAINER@GU20A>
Subject: 2nd correspondence re paper
To: ls5.j-parker@GU20A
cc: LS4.M-RAINER@GU20A

SALUTATION/PROF. PARKER:/COLON

Prof. Parker:

PARENS AND EXCLAMATION

The following is a rough (very!) outline for my paper.

TEXT FORM/OUTLINE

- I. A brief history of OPAC's in Public Libraries.
- II. Identification of select OPAC's in various Public Libraries.
- III. Description the subject search features and the record structures which support them.

INS REP ADV

GIV WRIT TAS REL INF

PRE ANN MAIL

Date: Wed 6 Feb 85 22:43:52-EST
From: Joan Parker <LS5.J-PARKER@GU20A>
Subject: Re: 2nd correspondence re paper
To: LS4.M-RAINER@GU20A
In-Reply-To: Message from "Marsha Rainer <LS4.M-RAINER@GU20A>"
of Wed 6 Feb 85 10:00:47-EST

SALUTATION/DEAR MARSHA,/COMMA

dear marsha,

EXCLAMATION

your project outline is excellent. i'm sure you will find plenty
of literature, & if you can find one or two (or more) case studies, ex-
amples of the systems you will find described in the literature, it will
be even more interesting and useful.

This is a great start! Now do some searching in the
literature.

CLOSING/SEE YOU NEXT WEEK

see you next week.

SIGNATURE

/prof. parker

Final Report

DISTRIBUTED TOTALS

Total Number of Characters in Messages:	738
Number of Messages	2
STU REP ADV	1
GIV WRIT TAS REL INF	1
PRE ANN MAIL	1
SUBJECT	1
CC	1
SALUTATION/PROF. PARKER:/COLON	1
PARENS AND EXCLAMATION	1
TEXT FORM/OUTLINE	1
INS REP ADV	1
GIV WRIT TAS REL INF	1
PRE ANN MAIL	1
SUBJECT	1
IN-REPLY-TO	1
SALUTATION/DEAR MARSHA,/COMMA	1
EXCLAMATION	1
CLOSING/SEE YOU NEXT WEEK	1
SIGNATURE	1

GRAND TOTALS

CATEGORIES:

GIV WRIT TAS REL INF	6
INS REP ADV	2
PRE ANN MAIL	1
STU REP ADV	2
	1

KEYS:

CC	11
CLOSING/SEE YOU NEXT WEEK	1
EXCLAMATION	1
IN-REPLY-TO	1
PARENS AND EXCLAMATION	1
SALUTATION/DEAR MARSHA./COMMA	1
SALUTATION/PROF. PARKER:/COLON	1
SIGNATURE	1
SUBJECT	2
TEXT FORM/OUTLINE	1

TO:

TO: LS4.M-RAINER@GU20A	2
TO: LS5.J-PARKER@GU20A	1
	1

Appendix C

Face Symbols and ASCII Character Set

Face Symbols

Face symbols are popular enough to be described in different kinds of traditional literature and in public files on individual computer systems. They are also posted on bulletin boards. Reprinted below are a variety of popular face symbols (although the list cannot be complete since new symbols are constantly being created) taken from five different sources.

The first list is resident on a Gotham University DEC-20 computer as the help file *smiley-face.hlp*. Any computer user who typed *help smiley-face* would receive this file, which was placed in the help directory by a computer center staff member. The second list was posted on the popular computer news system/bulletin board Net News (UUCP), originating from an IBM SHARE convention. The third list, a *New York Times* computer column, gives examples from the QuantumLink computer network. The humor/happiness and anger/depression symbols are represented differently here; the *Times* list uses one less character, the dash (-). The fourth list is taken from the Digital Equipment Corporation's published *Computer Conferencing User Guide*, with accompanying narrative on effective communication via computer. The final list is the text *smiles.txt* from the Boston Computer Society bulletin board system. Some symbols are common to each source, although the narrative introductions about their purpose is different and the explanations of the symbols are not identical.

Communications Breakthrough (note)⁸³

Because you can't see the person who is sending you electronic mail you are sometimes uncertain whether they are serious or joking. Recently, Scott Fahlman at CMU devised a scheme for annotating one's messages to overcome this problem. If you turn your head sideways to look at the three characters :-) they look sort of like a smiling face. Thus, if someone sends you a message that says "Have you stopped beating your wife? :-)" you know they are joking. If they say "I need to talk to you :-(", be prepared for trouble.

Since Scott's original proposal, many further symbols have been proposed here:

:-)	humor
:->	humor variation
%-}	humor variation
:-(	anger, sadness/unhappiness ⁸⁴
:-<	anger, sadness/unhappiness variation
:-\$	for those who put their money where their mouth is ⁸⁵
(:-)	for messages dealing with bicycle helmets
(8-)	for messages dealing with owls
d:-)	for messages dealing with baseball
q:-)	for those who wear their caps backwards
@=	for messages dealing with nuclear war
<:-)	for dumb questions
o>-< =	for messages of interest only to women
~=	a candle, to annotate flaming messages
oo	for somebody's head-lights are on messages

So you see, bit-map displays are really quite unnecessary :->

[End of SMILEY-FACE.HLP 22-Oct-84]

83. Source: Gothman University DEC-20 computer *smiley-face.hlp* help file.

84. Added by this researcher.

85. Developed by Professor Robert P. Taylor, Teachers College, 1984.

Subject: Smiley face :-) and variations⁸⁶

We're all familiar with the usual 90 degree smiley face :-) - however there are many other variations which could enrich our communications. (These came from Share, via the NERDC and UNH newsletters.)

:-O	Wow!
:-	Grim
:-	Baboon
:-v	Speaking
:-V	Shout
:-w	Speak with forked tongue
:-r	Sticking tongue out
:-*	Oops!
:-x	Kiss kiss
:-c	Real unhappy
:-C	Just totally unbelieving
:-B	Drooling
:-,	Smirk
:-	Anger
:-(	Frowning
'-)	Wink
;-)	Sardonic incredulity
%-}	Drunk with laughter
:-"	Pursing lips

Some real possibilities here - which could really deepen the errors in communication over the net. ':-)

86. Source: Newsgroups: net.followup, Wed, 25-Jun-86.

About Faces⁸⁷

Giggles, groans, grunts, guffaws, snorts, sighs and other verbal exclamations do not translate well in the electronic world of on-line communications. However, imaginative computer users have found a way to convey a wide range of emotions or expressions within the constraints of typed messages on electronic bulletin boards.

Users who "chat" with one another on the nationwide QuantumLink computer network, for example, have devised a symbolic shorthand to add a little zest to the usual alphabet. Hint: Rotate the symbols 90 degrees clockwise.

:)	I'm happy.
:(	I'm depressed.
:s	I have mixed feelings.
8)	I'm wide awake.
:o	I'm surprised.
(:o	I'm very surprised.
:p	pfft! (Sticking out the tongue.)
:9	yummy.
:/	Hmm.
:v	I'm chatting.
B)	I'm wearing my shades.

87. Source: Peter H. Lewis, "Peripherals," *The New York Times*, July 6, 1986.

"Writing Notes"⁸⁸

Facial Expression

One of the greatest difficulties when communicating by computer is that you often cannot tell if the author of a note is serious, joking, angry, or being sarcastic because you cannot see the author's face. As a result, users of computer-based conferencing systems have developed icons and other conventions for representing facial expression, especially the smile.

The colon, hyphen, and closing parenthesis form a smiling face (turned on its side). Some people prefer to spell out the word "smile" and enclose it in brackets. Some examples of icons are presented here for your consideration, but you should enjoy creating some of your own. These icons were created using the colon (:), semi-colon (;), hyphen (-), opening and closing parentheses, the vertical bar (|), right brace (}), slash (/), and the tilde (~).

: -)	Joking or sarcastic face
: - }	Fiendish grin
; -)	A wink
: - (	Sad or angry face
- (	Late night
~ / ~	Stirring up trouble

Insert in your text the pattern that reflects your mood.

88. Source: Vax Notes Manual, Copyright (c) 1985, 1986, Digital Equipment Corporation.

Smiles.Txt⁸⁹

:)	Smile
:(	Frown
:P	Tongue
:	Stiff upper lip
:/	Grunt
:>	Forced smile
:<	Very sad
;)	Wink
#(	Ouch!
#P	Ugh!
:B	Speaks with forked tongue!
:o	Ohhhhhh Nooooooooo!
.*	Cough
\$)	I smell a profit!

89. Source: Boston Computer Society Bulletin Board

ASCII Character Set

ASCII Code (ANSI X3.4-1968)

There are 128 characters in the ASCII (American National Standard Code for Information Interchange) "alphabet." The first group of characters consists of 33 nonprintable control characters which are not listed here. The following are the 95 printable ASCII characters including upper- and lowercase alphabetic, punctuation and numeric characters.

Uppercase Alphabetic Characters (letters)

Character	Remarks
A	
B	
C	
D	
E	
F	
G	
H	
I	
J	
K	
L	
M	
N	
O	
P	
Q	
R	
S	
T	
U	
V	
W	
X	
Y	
Z	

Lowercase Alphabetic Characters (letters)

Character	Remarks
a	
b	
c	
d	
e	
f	
g	
h	
i	
j	
k	
l	
m	
n	
o	
p	
q	
r	
s	
t	
u	
v	
w	
x	
y	
z	

Punctuation Characters

Character	Remarks
SP	Space, blank
!	Exclamation mark
"	Doublequote
#	Number sign, pound sign
\$	Dollar sign
%	Percent sign
&	Ampersand
'	Apostrophe, accent acute
(	Left parenthesis
)	Right parenthesis
*	Asterisk, star
+	Plus sign
,	Comma
-	Dash, hyphen, minus sign
.	Period, dot
/	Slash
:	Colon
;	Semicolon
<	Left angle bracket
=	Equal sign
>	Right angle bracket
?	Question mark
@	At sign
[	Left square bracket
\	Backslash
]	Right square bracket
^	Circumflex, up arrow
_	Underscore, left arrow
`	Accent grave
{	Left brace (curly bracket)
	Vertical bar
}	Right brace (curly bracket)
~	Tilde

Numeric Characters

Character	Remarks
0	Zero
1	One
2	Two
3	Three
4	Four
5	Five
6	Six
7	Seven
8	Eight
9	Nine

Appendix D
General Message Distributions

Table D.1

Respondent Messages With and Without Paralanguage by Rank

Messages	Total	With Paralanguage	Without Paralanguage
Number of Messages	128 (69,044)	84 (52,020)	44 (17,024)*
Novice	83 (40,836)	53 (28,964)	30 (11,872)
Advanced	45 (28,208)	31 (23,056)	14 (5,152)

* Length in characters.

Table D.2

Respondent Messages With and Without Paralanguage by Rank and Type of Communication

Message Type	Total
I. Asking for Computer Task Related Information	9
Novice	7
Advanced	2
II. Giving Computer Task Related Information	40
Novice	33
Advanced	7
III. Asking For Written Task Related Information	3
Novice	3
Advanced	0
IV. Giving Written Task Related Information	54
Novice	34
Advanced	20
V. Giving General Information	3
Novice	1
Advanced	2
VI. Personal	16
Novice	4
Advanced	12
VII. Other	3
Novice	1
Advanced	2
Grand Total:	128
Novice	83
Advanced	45

Appendix E

Distribution of Paralanguage in Electronic Mail

Table E.1

Messages With Paralanguage by Rank and Type of Communication

	AC	GC	AW	GW	GG	PR	OT	Total
Novice	4	21	2	22	0	3	1	53
Advanced	0	4	0	15	1	9	2	31
Total	4	25	2	37	1	12	3	84

Key:

AC	Asking for Computer Task Related Information
GC	Giving Computer Task Related Information
AW	Asking for Written Task Related Information
GW	Giving Written Task Related Information
GG	Giving General Class Information
PR	Personal
OT	Other

Table E.2Messages Without Paralanguage by Rank and Type of Communication

	AC	GC	AW	GW	GG	PR	OT	Total
Novice	3	12	1	12	1	1	0	30
Advanced	2	3	0	5	1	3	0	14
Total	5	15	1	17	2	4	0	44

Table E.3

Distribution of Paralanguage by Rank, Type of Communication and Feature

	AC	GC	AW	GW	GG	PR	OT	Total
Vocal Spellings								
Novice								2
Advanced				1		1		0
								2
Lexical Surrogates/ Vocal Segregates								5
Novice		4						4
Advanced						1		1
Manipulation of Grammatical Markers								115
Novice	6	39	1	23	0	4	2	75
Advanced	0	6	0	19	1	13	1	40
Manipulation of Special Symbols								1
Novice								0
Advanced				1				1
Spatial Arrays								1
Novice								0
Advanced						1		1
Text Forms								43
Novice	1	6	2	16	0	1	0	26
Advanced	0	1	0	11	0	4	1	17
Text Movement								0
Novice	7	47	3	40	0	6	2	105
Advanced	0	7	0	32	1	20	2	62
Grand Total:	7	54	3	72	1	26	4	167

Table E.4

Distribution of Grammatical Markers by Rank and Type of Communication

	AC	GC	AW	GW	GG	PR	OT	Total
Novice	6	39	1	23	0	4	2	75
a. Capitals/ Uppercasing		5		4			1	10
b. Ellipses		3		4				7
c. Exclamation Point(s)	5	23	1	11		4		44
d. Parentheses				1			1	2
e. Question Mark		2						2
f. Question Marks 1		2						3
g. Quotation Marks		2		3				5
h. Square Brackets		2						2
Advanced	0	6	0	19	1	13	1	40
a. Capitals/ Uppercasing		1		1		1		3
b. Ellipses		1		3				4
c. Exclamation Point(s)		1		6		5	1	13
d. Parentheses		2		3	1	3		9
e. Question Mark								0
f. Question Marks								0
g. Quotation Marks		1		6		4		11
h. Square Brackets								0
Novice	6	39	1	23	0	4	2	75
Advanced	0	6	0	19	1	13	1	40
Grand Total:	6	45	1	42	1	17	3	115

Table E.5

Distribution of Text Forms by Rank and Type of Communication

	AC	GC	AW	GW	GG	PR	OT	Total
Novice	1	6	2	16	0	1	0	26
a. Salutation/Txt 1		5	2	8		1		17
b. Outline				4				4
c. Short Lines		1		1				2
d. No Lines/Paragraph				2				2
e. List/Bibliography				1				1
f. List/Msc/Numbered								0
g. Poetry								0
Advanced	0	1	0	11	0	4	1	17
a. Salutation/Text		1		2		1	1	5
b. Outline				4				4
c. Short Lines								0
d. No Lines/Paragraphs								0
e. List/Bibliography				1				1
f. List/Msc/Numbered				2				2
g. Poetry				2		3		5
Novice	1	6	2	16	0	1	0	26
Advanced	0	1	0	11	0	4	1	17
Grand Total:	1	7	2	27	0	5	1	43

Table E.6

Complete Distribution of Positive and Negative Stress for Novice Respondents

A. <u>Computer Task</u>		Positive = 17	Negative = 16	Total = 33
	Positive (N=17**)		Negative (N=16*)	
Excitement	7	Excitement	0	
		Frustration	5	
Surprise	3	Surprise	3	
Success	5	Failure	1	
Mock-Anger	1	Anger/Frustration/Failure	1	
		Anger/Frustration	2	
B. <u>Written Task</u>		Positive = 6	Negative = 1	Total = 7
	Positive (N=6**)		Negative (N=1*)	
Excitement	5	Excitement	1	
Success	2**	Anger/Failure	1*	
		Anger	1*	
		Surprise	1*	
		Frustration	1*	

* Four computer related statements with negative stress counted in negative computer stress category.

** One computer related statement with positive stress counted in positive computer stress category.

(continued)

Table E.6 (continued)

In the computer related messages, the distributions among the individual respondents were:

Frustration and Negative Surprise:	3 different respondents for each
Positive Excitement:	3 respondents
Success:	4 respondents
Surprise:	2 respondents

In the written task related messages, the distributions among the individual respondents were:

Positive Excitement:	3 respondents
Success:	2 respondents

All other instances of stress were from single respondents.

Note on Figures

All figures in this section, E.1 through E.6, are arranged as depicted in the Key to Figures. The 16 respondents are classed first by rank, i.e., Novice and then Advanced, and within each group/rank are placed in the ascending order of their *total* number of messages sent, which includes messages with and without paralanguage. The group and ascending order of messages is demonstrated in the Key to Figures. For example, the first novice respondent, labeled N-1, sent 3 messages in total, while novice respondent N-5 sent 8, and novice N-10 sent 17. Advanced respondent A-1 sent 4 messages, while advanced respondent A-6 sent 14. For Figures E.1 through E.6, this novice-advanced grouping and ascending order of messages is the same, and each bar represents one respondent, as shown below.

Key To Figures

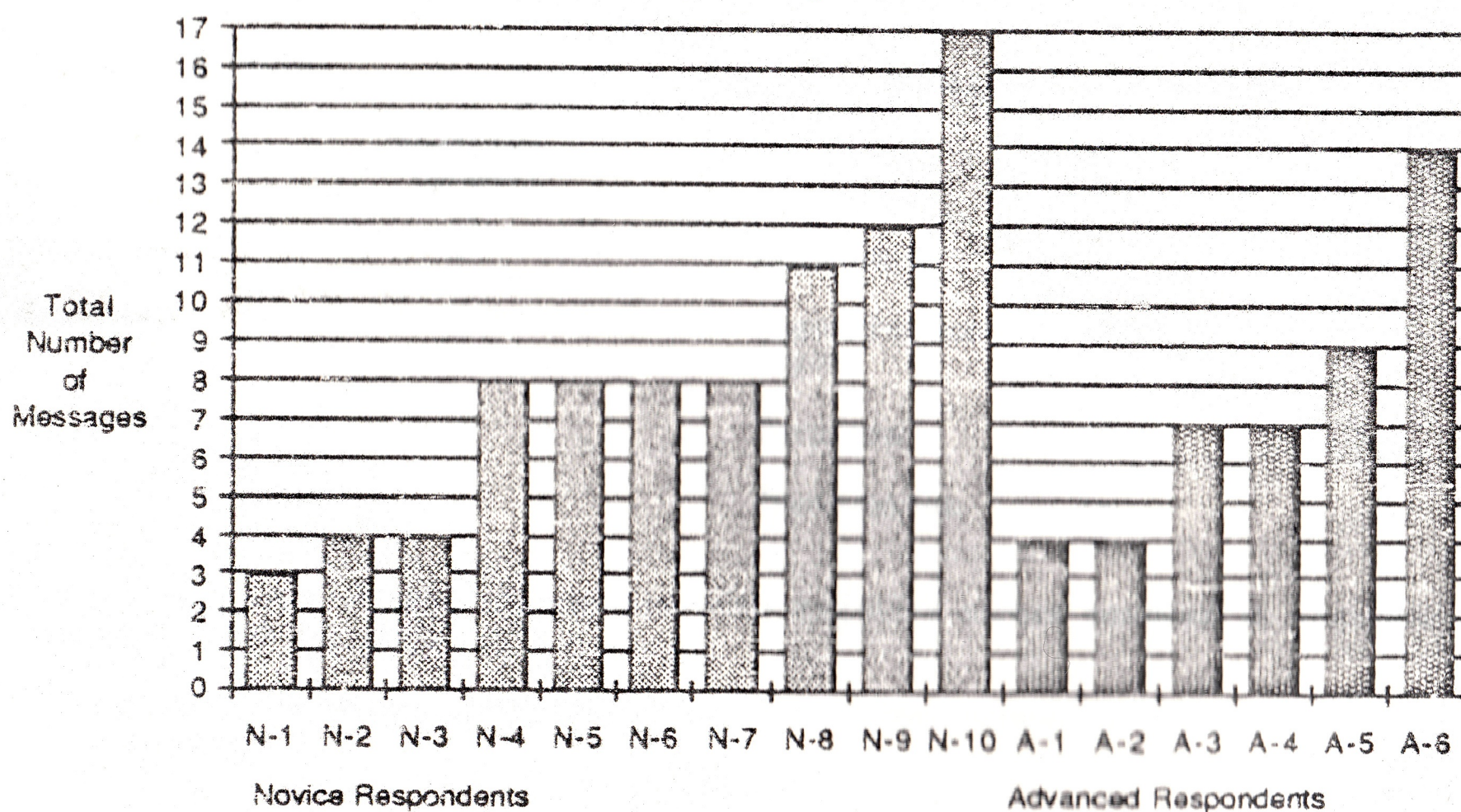


Figure E.1: Distribution of Paralanguage by Rank and Total Number of Respondent Messages by Individual

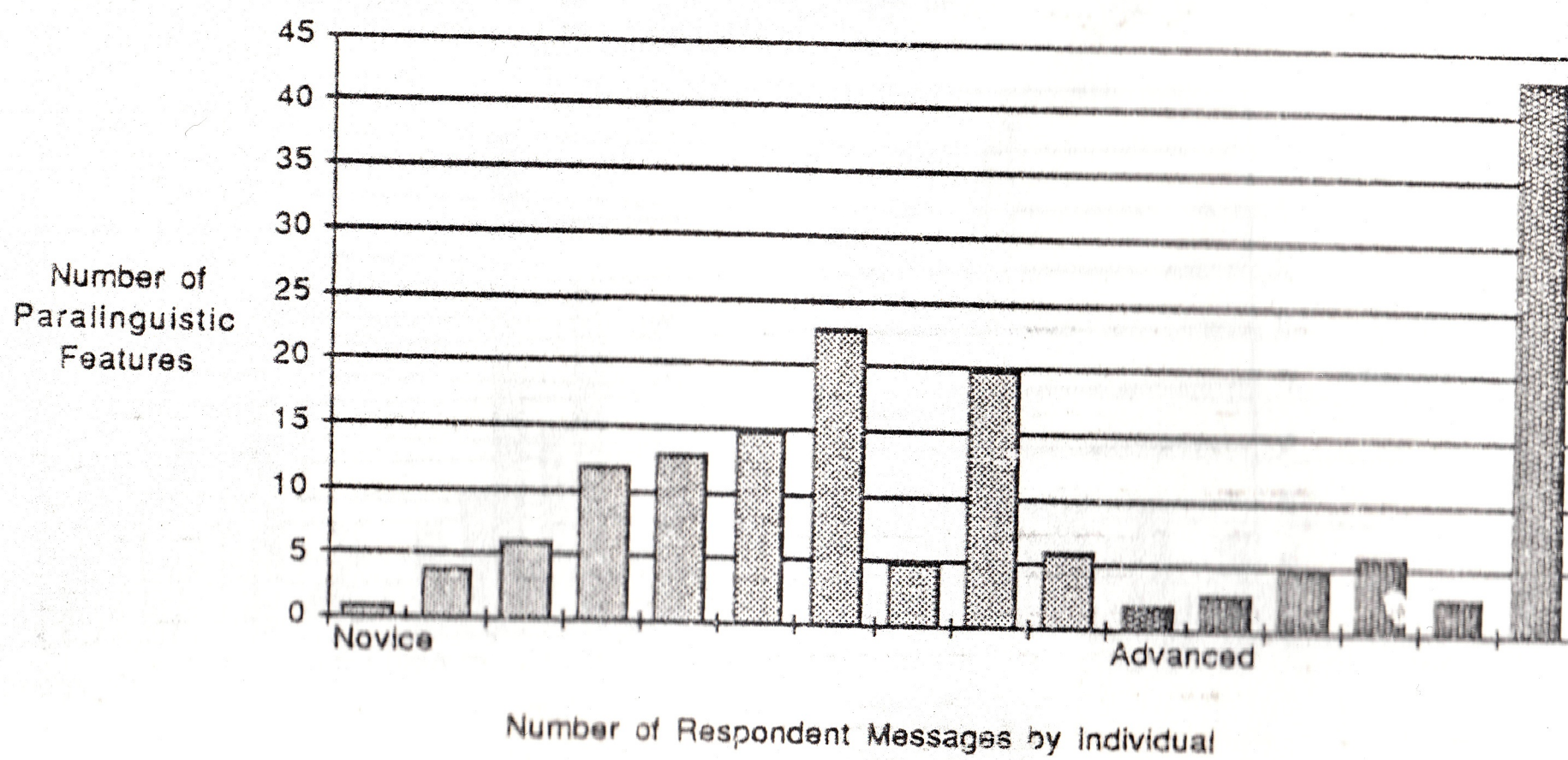


Figure E.2: Comparison of Total Number of Messages to Messages With Paralanguage by Rank and Respondent

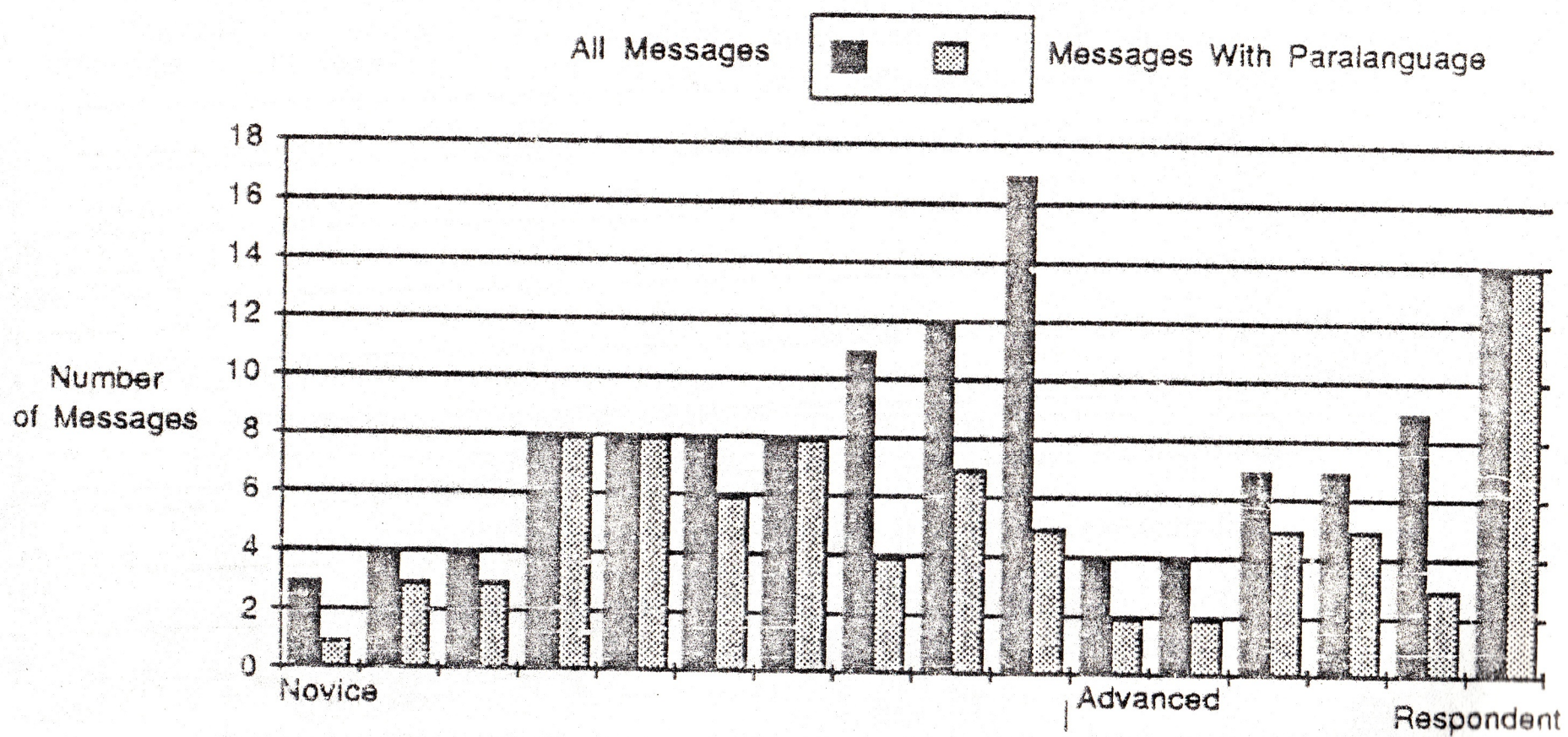


Figure E.3: Distribution of Grammatical Markers by Rank and Respondent in Written and Computer Messages

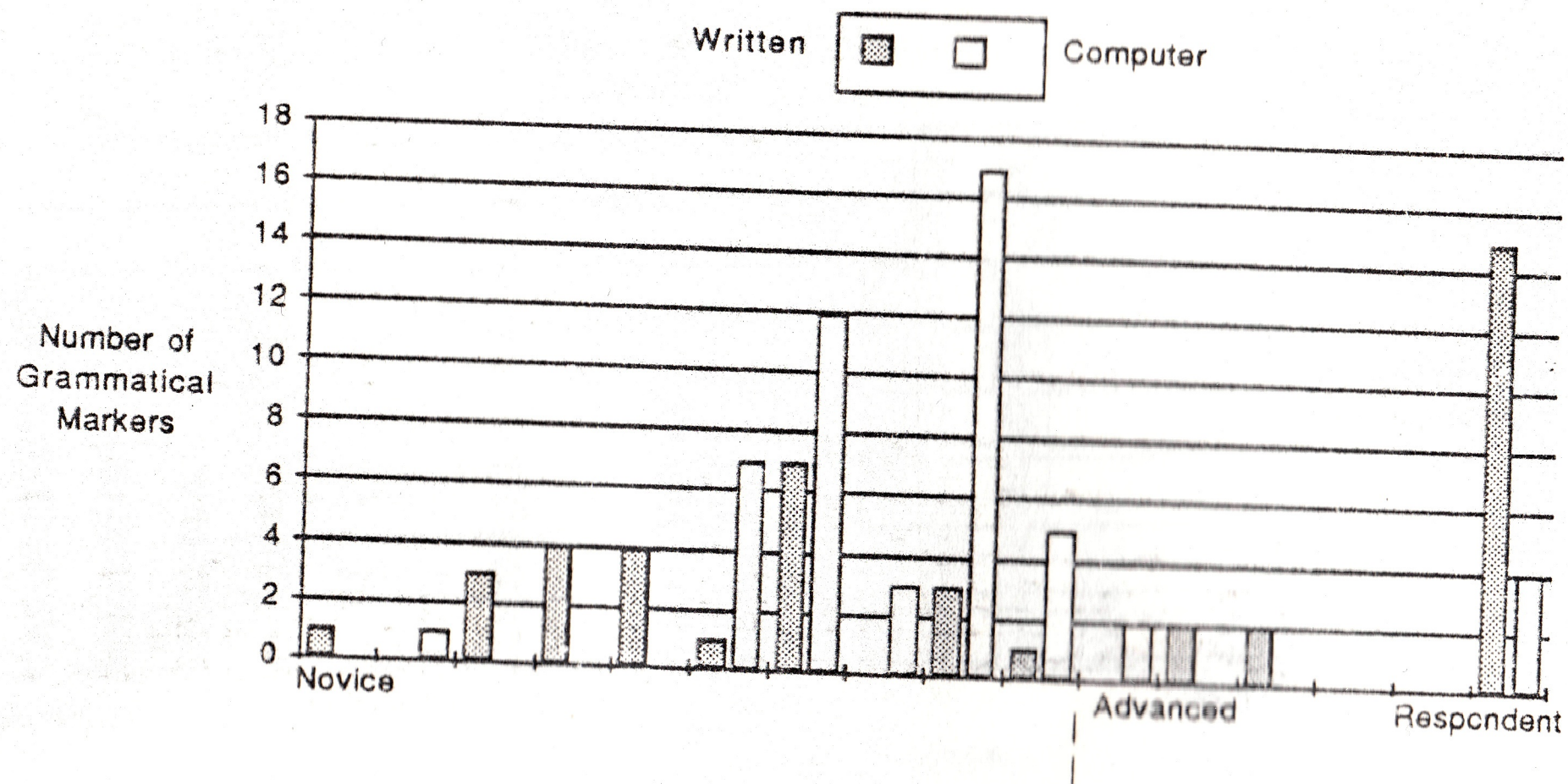


Figure E.4: Distribution of Text Forms by Rank and Respondent in Written and Computer Messages

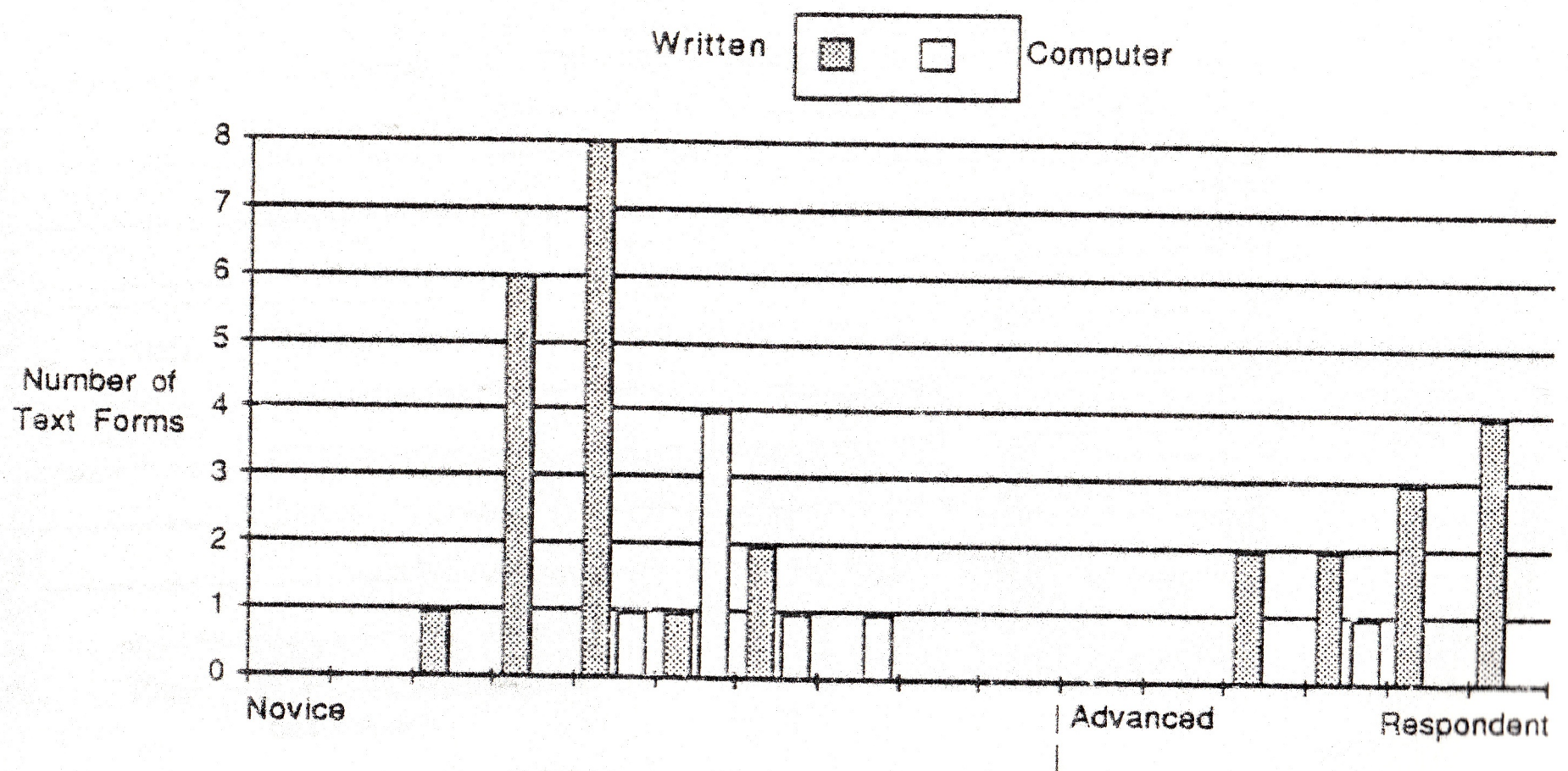


Figure E.5: Distribution of Exclamation Points by Rank and Respondent in All Messages

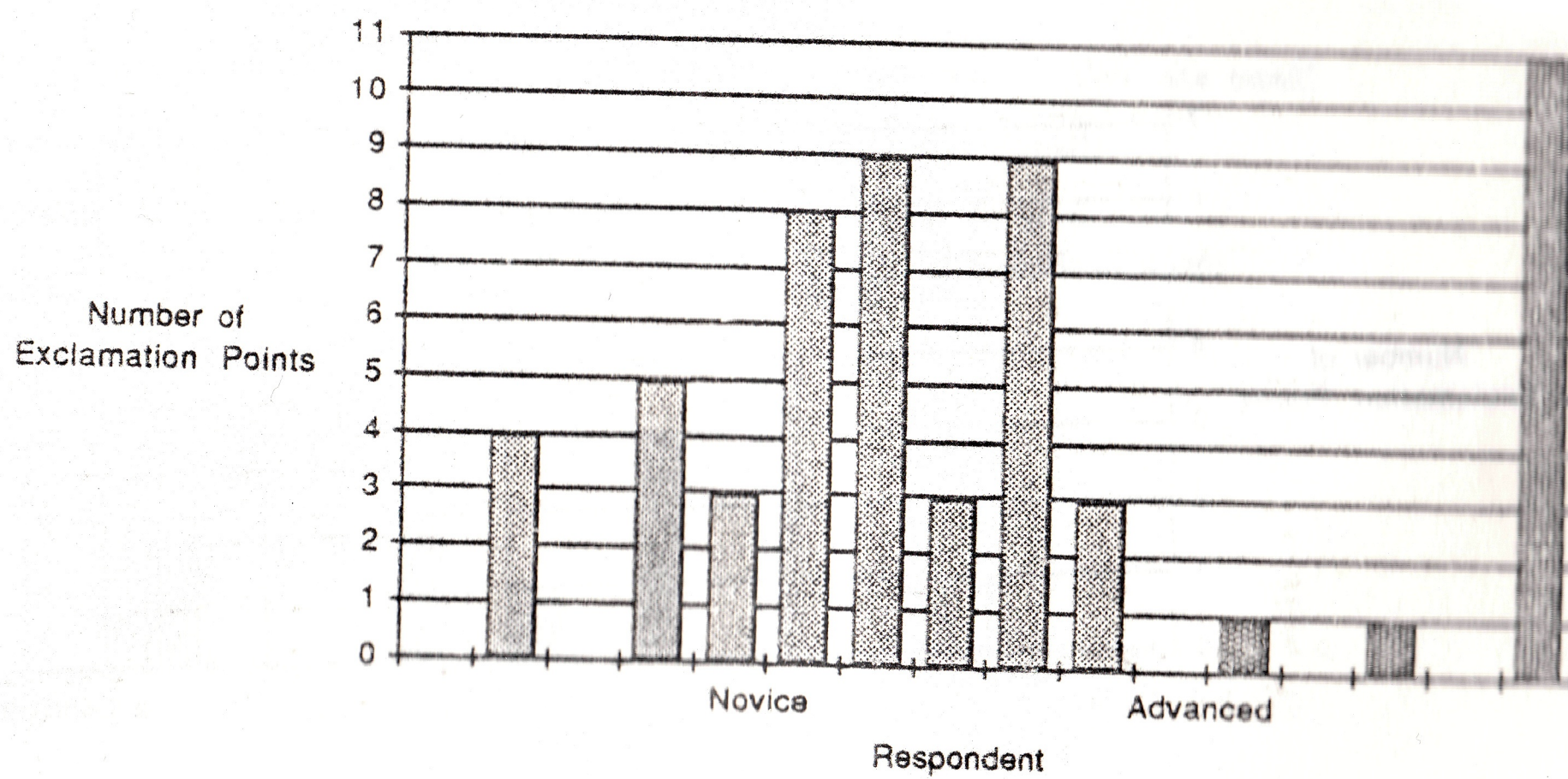
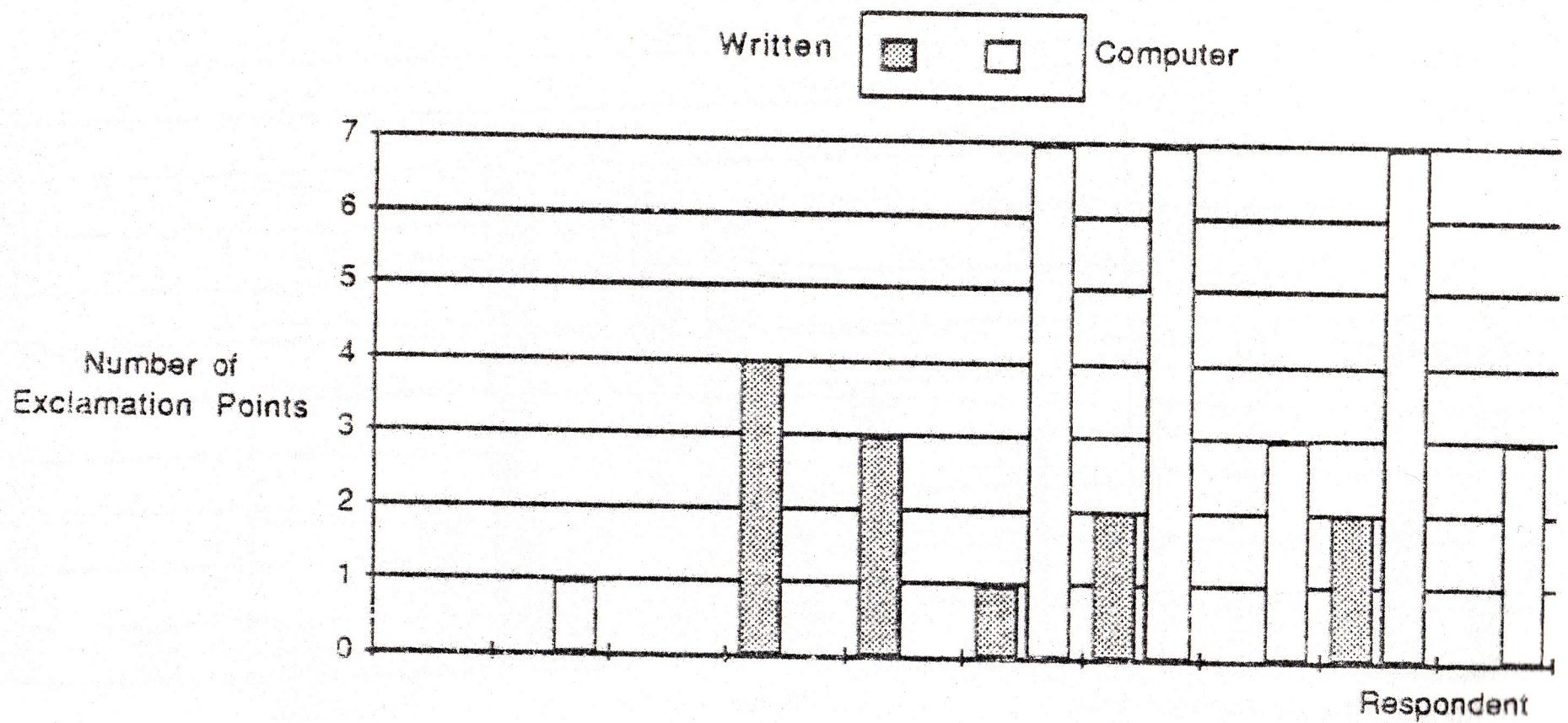


Figure E-6: Distribution of Exclamation Points in Written and Computer Messages for Novice Respondents



List of Other Paralinguistic Features

1. Vocal Spellings

- a) ol'
- b) Hullo!⁹⁰

2. Lexical Surrogates/Vocal Segregates

- a) (Whoops - perhaps I am showing my ignorance. Too late now!)
- b) I have been successful in making a finger-plan(yeah!)
- c) Hooray! I was successful. Just as I was about to give up on the finger plan for the umpteenth time, Kate Lindsey came into the computer room and saved me.
- d) Scream!!!!!!!!!!!!!!!!!!!!
- e) Pretty good, huh?

4. Special Symbols

- a) *****

5. Spatial Arrays⁹¹

- a) Subject: sad news :-(

90. Salutation

91. In message subject header